Norton Utilities™ for Macintosh® Reference Guide

Norton
Utilities™ 6.0
For Macintosh

Norton Utilities™ for Macintosh® Reference Guide

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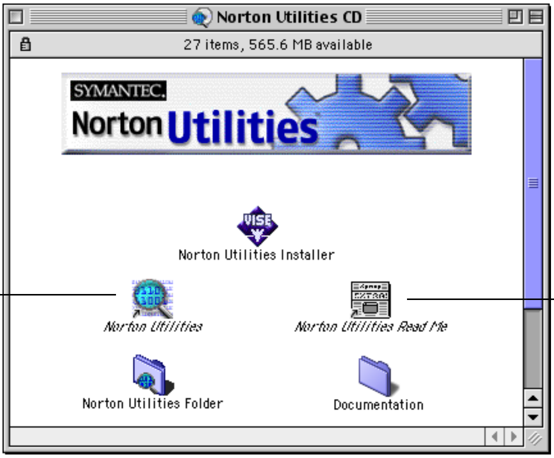
Introduction

About this CD



Application icon and folder

Double-click to open the Read Me file

As well as the Norton Utilities Installer and application, there are several other items on the CD:

- Norton Utilities folder: Contains the tools that make up Norton Utilities, including Norton Disk Doctor, Speed Disk, and UnErase. Inside, located in the Norton Tools folder, is the Tech Support Tools folder, which contains special tools for use by Symantec Technical Support.
- Read Me: Contains late breaking information, troubleshooting tips, installation instructions, and the default location of all files installed by Norton Utilities.
- Documentation Folder: Contains a Reference Guide in PDF format and installation files for Adobe Acrobat Reader.
- System Folder: Lets you restart from the CD to run Norton Utilities before you install, or any time you need to perform repair, recovery, or optimization on the disk containing your own System files.
- SimpleText application: Lets you read the Read Me file.

About this reference guide

This reference guide is provided in Adobe Acrobat Portable Document Format (PDF) file and contains instructions on how to use Norton Utilities for Macintosh.

To use the PDF file:

- Click any table of contents or index entry to go to that section.
- Click any cross-reference to go to the reference.
- If you can't find the information you want in the Table of Contents or Index, try the Search features on the Adobe Acrobat menu.

Note: The Read Me file on the Norton Utilities for Macintosh CD contains information that was unavailable at the time this guide was published. Read this information before you go any further.

Getting more information

Extensive context-sensitive help is built into the Norton Utilities for Macintosh application. Together with this *Reference Guide*, these documents provide a wealth of valuable information about Norton Utilities for Macintosh:

- See *Norton Utilities for Macintosh Guide* help files for information about Norton Utilities features. To access Help, choose the Guide from the Help menu on any screen in any Norton Utilities tool.
- See Norton Utilities Balloon Help for explanations of items on the screen. To turn on Balloon Help, choose Show Balloons from the Help Menu; point to any item to see a description.

Apple Guide Help

Norton Utilities Apple Guide Help provides extensive help, accessible from the Help menu in most Norton Utilities tools, or by clicking a Help button in many windows and dialog boxes.

Norton Utilities Apple Guide Help and Shortcuts include:

- Step-by-step guidelines to Norton Utilities procedures

- Definitions of terms related to Norton Utilities and your computer
- Tips and shortcuts to make Norton Utilities applications faster and easier to use.

About emergency recovery

The following pages contain step-by-step procedures for repairing damaged disks and recovering lost or corrupted data in emergency situations. They contain summaries of how to use Norton Utilities tools. Further information about all the Norton Utilities tools is found in the other chapters in this book.

Norton Disk Doctor, Volume Recover, and UnErase are the Norton Utilities tools used for disk repair and file recovery:

- Norton Disk Doctor repairs more types of damage than any other disk repair program. For more information, see “Running Norton Utilities from the CD” on page 12, and “Restoring an entire disk” on page 20.
- If you have unintentionally initialized your hard disk and want to restore the data, or if your disk is beyond repair, run Volume Recover to restore critical information to your disk. For more information on using Volume Recover for emergency recovery, see “Restoring an entire disk” on page 20.
- UnErase recovers files from the damaged disk and copies them to an undamaged disk. For information on using UnErase for emergency data recovery, see “Repairing damaged disks” on page 14.
- If these tools are unable to help immediately, read the “More troubleshooting procedures” on page 30 for more suggestions on how to restore your disks or recover data.

Before you begin

If you have them, gather together the disks that came with this package, the disks that came with your Macintosh, and some blank floppy disks or other removable, writable media. You may not need these things for all procedures, but it is a good idea to keep them ready.

If you just purchased this package

If your disk is damaged or contains erased files that you want to recover, do *not* install the Norton Utilities to your disk. Start up your Macintosh from the Norton Utilities for Macintosh CD, and run Norton Disk Doctor. See “Running Norton Utilities from the CD” on page 12.

Note: Certain newer Macintosh computers require specific versions of a file called “Mac OS ROM” to start up. If you are unable to restart your computer from the Norton Utilities CD, see the Read Me file on the Norton Utilities CD.

If Norton Utilities is installed

Run Norton Utilities only from an undamaged disk. If you think that your Startup Disk is damaged, start up your Macintosh from the Norton Utilities for Macintosh CD, and run Norton Disk Doctor from the CD.

Running Norton Utilities from the CD

Use the Norton Utilities for Macintosh CD as a Startup Disk for troubleshooting purposes, as well as for installing Norton Utilities on your computer. Using the CD as a Startup Disk lets you access your computer without using your hard drive, so you can make certain types of repairs with Norton Disk Doctor or Disk Editor, or optimize the drive with Speed Disk.

To restart from the Norton Utilities for Macintosh CD:

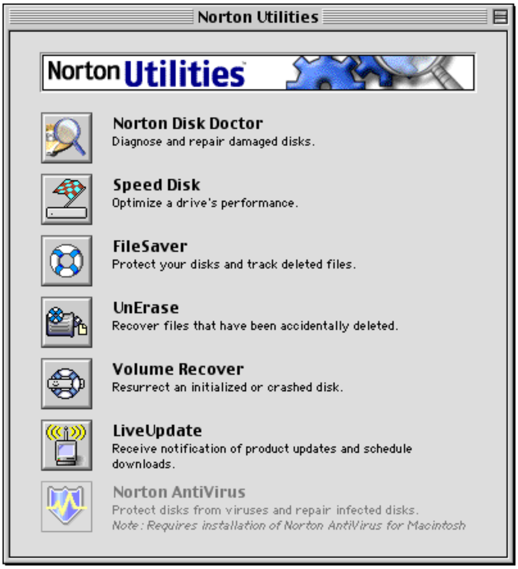
1. Insert your Norton Utilities for Macintosh CD into the CD-ROM drive.
2. Restart from your Norton Utilities CD using one of the following methods:
   - On the Special menu, click Restart, while pressing the C key on the keyboard.
   - On a Macintosh computer with a third-party or external CD-ROM drive, go to Control Panels, click Startup Disk, and select the Norton Utilities for Macintosh CD as your Startup Disk. Close the Startup Disk control panel. On the Special menu, click Restart.

You can tell that your computer has restarted from the CD because the Norton Utilities for Macintosh pattern appears in the background of the Desktop.

If the CD window doesn't open automatically, double-click the CD icon to open it.

3 In the CD window, double-click the Norton Utilities icon.

The Norton Utilities main window appears. If you have Norton AntiVirus for Macintosh installed, its icon appears on the Norton Utilities main window.



Norton Disk Doctor
Diagnose and repair damaged disks.

Speed Disk
Optimize a drive's performance.

FileSaver
Protect your disks and track deleted files.

UnErase
Recover files that have been accidentally deleted.

Volume Recover
Resurrect an initialized or crashed disk.

LiveUpdate
Receive notification of product updates and schedule downloads.

Norton AntiVirus
Protect disks from viruses and repair infected disks.
Note : Requires installation of Norton AntiVirus for Macintosh

From the Norton Utilities main window you can:

- Run Norton Disk Doctor. See "Repairing damaged disks" below.
- UnErase recently erased files. See "Recovering files with UnErase" on page 18.
- Run Volume Recover to rebuild directories or restore an entire disk. See "Using Volume Recover" on page 21.

Repairing damaged disks

If you have a damaged or crashed disk, run Norton Disk Doctor. The type of damage determines how much data is recoverable. However, if the disk was protected by FileSaver, chances are good that the disk can be repaired or recovered quickly and easily.

Note: When booted from the CD, Norton Disk Doctor can repair damage to disks formatted under most Mac OS versions. For more details of supported versions, please see the Read Me file.

Norton Disk Doctor checks your disk for damage and asks you for permission before repairing any damage. Depending on the type of damage, Norton Disk Doctor may tell you to run Volume Recover or UnErase. In these cases, you can start the programs directly from Norton Disk Doctor.

Tip: If you only want to diagnose the disk or if you want to disable specific tests, you can do so from the Norton Disk Doctor Preferences dialog box. See "Setting preferences" on page 72.

To run Norton Disk Doctor:

1 In the Norton Utilities main window, click the Norton Disk Doctor button.

The Norton Disk Doctor window appears.

The small icons to the right of the disk icons indicate each disk's potential for examination and repair:

Macintosh icon	The disk contains the active System files and some repair functions will be limited.
Application icon	The disk contains the Norton Disk Doctor application and some repair functions will be limited.
Lock icon	The disk is write-protected and Norton Disk Doctor can examine the disk, but cannot perform any repairs on it.

If you see a disk without a name or with a name you do not recognize, select the disk and click the Get Info button, or choose Get Info from the File menu. The Get Info window displays information about the selected disk that might help you identify it.

2 Select the damaged disk.

If the damaged disk is a floppy disk or other type of removable disk, insert it now.

If you do not see the disk you want to select, choose Show Missing Disks from the Disks menu. If the disk still does not appear, see "Selecting missing disks" on page 61.

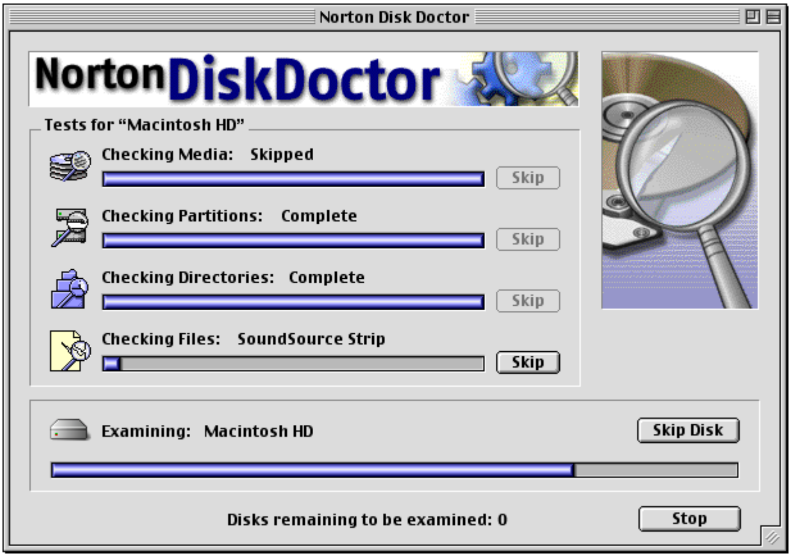
If you restarted from the CD (or have set your Preferences to Always Ask For An Undo File Location) Norton Disk Doctor might prompt you to choose a location for Undo files.

Because Norton Disk Doctor repairs directories during its scan, it is possible that a repair might cause an unwanted result. The Undo file lets you return your hard disk to the state before Norton Disk Doctor conducted the repair. Repairs to some problems can't be reversed.

3 Select a folder for the NDD Undo file and click Choose.

You should save the Undo file to a disk other than the one you are examining. By default, Norton Disk Doctor saves the Undo files at the root level of the boot drive, in a folder called Disk Doctor Undo Files.

4 Norton Disk Doctor begins testing your selected disk.



Tests for "Macintosh HD"

Checking Media: Skipped

Checking Partitions: Complete

Checking Directories: Complete

Checking Files: SoundSource Strip

Examining: Macintosh HD

Disks remaining to be examined: 0

The progress bar indicates when each test is completed. Norton Disk Doctor checks every area of your disk, looking for problems that need immediate attention as well as file problems that could give you problems in the future.

Note: If the disk is damaged severely and the Finder is active, the Finder may try to display an alert message. Your Macintosh will beep and display a Macintosh icon on the right side of the menu bar. Make sure that Norton Disk Doctor is the active application in the Application menu. Do not select the Finder.

5. When Norton Disk Doctor encounters an error, it displays an alert dialog box.

   Read the description of the problem and follow the recommendation. For more information on alert messages, see "If an error is found" on page 17.

6. If you want to skip a test, click Skip. If you have selected more than one disk to test, you can also click Skip Disk.

   When Norton Disk Doctor is finished, it displays the results for each disk tested in a report window.

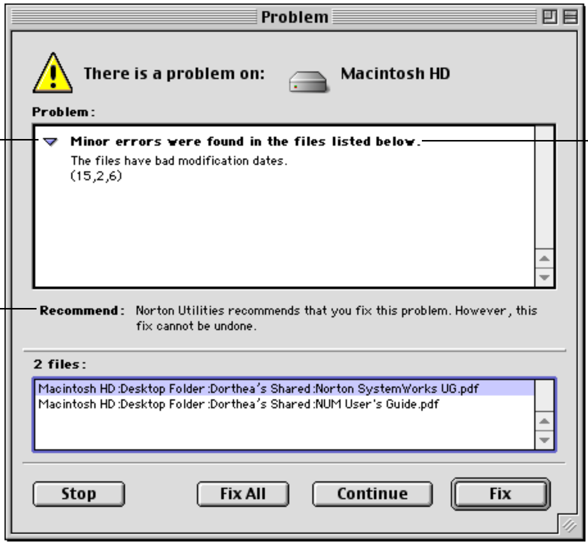
7. Click Done to return to the Norton Disk Doctor window.
8. Close Norton Disk Doctor.

   If this was your Startup Disk, restart your Macintosh. Check to see if the names of the folders and files are correct and that icons are correct.

9. If these procedures solved your problem, it's now safe to install Norton Utilities. See "Installing Norton Utilities for Macintosh" on page 36.

If an error is found

If the error looks like it can be fixed, Norton Disk Doctor lets you decide whether to fix it.



There is a problem on: Macintosh HD

Problem:

Minor errors were found in the files listed below.
The files have bad modification dates.
(15,2,6)

Recommend: Norton Utilities recommends that you fix this problem. However, this fix cannot be undone.

2 files:

Macintosh HD:Desktop Folder:Dorthea's Shared:Norton SystemWorks UG.pdf
Macintosh HD:Desktop Folder:Dorthea's Shared:NUM User's Guide.pdf

Click for a detailed description of the problem

Recommended course of action

Description of the problem

To respond to a repair alert message:

- Click Fix to repair the error for the first selected file.
- Click Fix All to repair the error in all the listed files.
- Click Continue to skip the repair and continue diagnosing the disk.
- Click Stop to end the session.

If Norton Disk Doctor cannot fix the error, it informs you of the problem and makes a recommendation.

If the error cannot be fixed, Norton Disk Doctor may start Volume Recover.

Note: If your disk is damaged severely and you choose not to fix problems, Norton Disk Doctor may be unable to finish diagnosing the disk. Norton Disk Doctor informs you when it cannot continue.

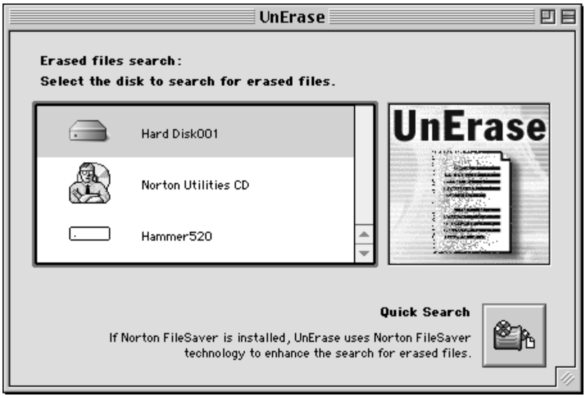
Recovering files with UnErase

If you have accidentally deleted files, or files are missing, try using UnErase.

Warning: Although you can recover an erased file to the same disk, it is safer if you specify a floppy disk, another type of removable media, a network drive, or another hard disk, if you have one. When you recover to the same disk, you jeopardize your chances of recovering other erased files. If a recovered file is too large to fit on a single floppy disk, UnErase automatically splits the file across as many disks as needed. Just follow the prompts. See “Rejoining file segments” on page 93, for directions to rejoin a file that has been split.

To UnErase files:

1 In the Norton Utilities main window, click UnErase.



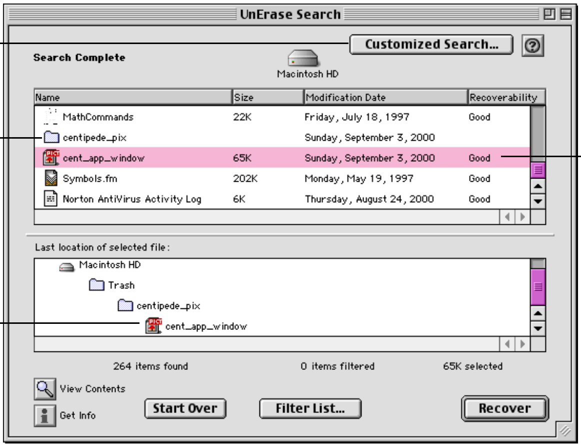
Erased files search:
Select the disk to search for erased files.

If Norton FileSaver is installed, UnErase uses Norton FileSaver technology to enhance the search for erased files.

2 Select the drive to search for lost files.

3 Click Quick Search.

UnErase searches the selected disk for erased files and displays the results in the UnErase Search window, with an estimate of successful recovery.



Search Complete

Name	Size	Modification Date	Recoverability
MathCommands	22K	Friday, July 18, 1997	Good
centipede_pix		Sunday, September 3, 2000	
cent_app_window	65K	Sunday, September 3, 2000	Good
Symbols.fm	202K	Monday, May 19, 1997	Good
Norton AntiVirus Activity Log	6K	Thursday, August 24, 2000	Good

Last location of selected file:

- Macintosh HD
  - Trash
    - centipede_pix
      - cent_app_window

264 items found   0 items filtered   65K selected

Choose a search method from the pop-up menu

Erased files appear in the list

Location of file before it was erased

Estimate of success

4 To view the erased files in another way:

- Click a column title—Name, Size, Modification Date, or Recoverability—to sort the UnErase window listing.
- Select a file in the UnErase window and click View to view the contents of a file either before or after it is recovered.
- Select a file in the UnErase window and click Get Info to get information about an erased file.

5 Select an erased file and click Recover.

The Recovery Destination dialog box appears with a confirmation of the files to be recovered and the disk from which you are recovering.

6 If the needed files are not found, you can do a more customized search. For information, see "Performing customized searches" on page 84.

For information on other UnErase search-and-rescue techniques for erased files, and how to salvage data if Norton Disk Doctor reports that a disk is irreparably damaged, see "Recovering erased or missing data" on page 76.

Caution: If you purchased Norton Utilities for Macintosh to recover an erased file, do not install it to the disk that contains the file you want to recover—doing so could prevent recovery.

Tip: Use Speed Disk regularly to reduce file fragmentation. When files are not fragmented, you have a greater chance for recovery. See "Defragmenting files" on page 112 for more information on defragmenting files.

If an erased file is not found

Depending upon the situation, UnErase uses one of four methods to search for erased files or lost data: the default FileSaver Search, and customized Directory Searches, File Pattern Searches, or Text Searches. Because it is the most reliable, UnErase uses a combination of a FileSaver Search and Catalog Search for its initial search if the FileSaver information file is found on the disk; otherwise, UnErase first tries a Catalog Search alone. If you do not have success with the first method UnErase uses, select a customized search.

To specify an UnErase search method:

1. In the UnErase Search window, choose one of the search methods.
2. Click Search in the main window.

   For details on all the search methods, see "Performing customized searches" on page 84.

Restoring an entire disk

Volume Recover restores critical information that identifies a disk. If the partition information on the disk is damaged, run UnErase to recover files. For full details on how to use Volume Recover, see "Recovering data from damaged volumes" on page 95.

You can also use Volume Recover to rebuild damaged or missing directory data. For more information, see "Rebuilding directories" on page 100.

Using Volume Recover

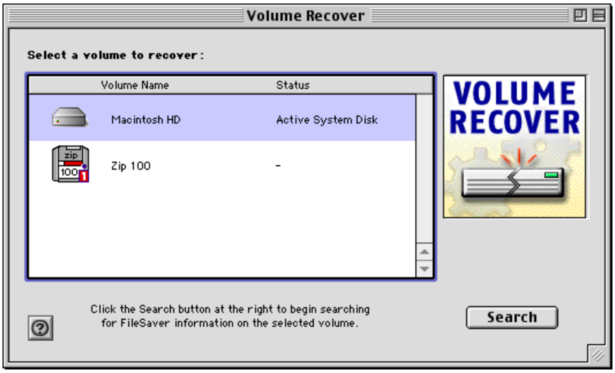
By restoring critical information on a severely damaged disk, you may be able to return the disk to a condition that Norton Disk Doctor can repair.

Note: Volume Recover will not recover data to your Startup Disk, to locked disks, or to disks from which the Volume Recover application is running. If you select one of these disks, the Recover button is disabled.

To use Volume Recover:

1 Click Volume Recover in the Norton Utilities main window.

You can also choose Volume Recover from the Norton Disk Doctor Utilities menu.



Volume Recover

Select a volume to recover:

Volume Name	Status
Macintosh HD	Active System Disk
Zip 100	-

Click the Search button at the right to begin searching for FileSaver information on the selected volume.

2 Select the disk to recover.

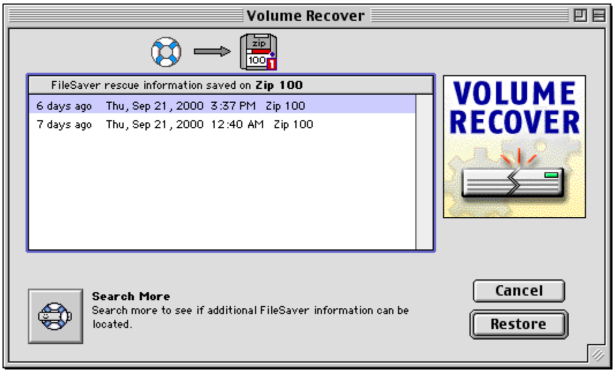
If the damaged disk is a floppy disk or other type of removable disk, insert it now and verify that it is selected.

If you do not see the disk you want to select, choose Show Missing Disks from the Tools menu. If the disk still does not appear, see "Selecting missing disks" on page 61.

3 Click Search.

If FileSaver information is not found, you are given the option to Rebuild Directories. For more information, see "Rebuilding directories" on page 100.

When Volume Recover finds the FileSaver data, it displays a dialog box.



FileSaver rescue information saved on **Zip 100**

6 days ago Thu, Sep 21, 2000 3:37 PM Zip 100
7 days ago Thu, Sep 21, 2000 12:40 AM Zip 100

Search More
Search more to see if additional FileSaver information can be located.

4 Select a FileSaver information file.

Always select the most recent file, unless you know that your disk was damaged before that date and time. In that case, you should use the older file.

If FileSaver information is more than one week old, you are given the option to Rebuild Directories. For more information, see "Rebuilding directories" on page 100.

Caution: If you must use an older FileSaver file to recover data, you will be restoring your disk to the way it was on the date the FileSaver data was saved. You will lose any changes to files created or modified after the date of that FileSaver file.

---

5 Click Restore to begin copying the FileSaver data.

Volume Recover displays a message reminding you that the directory information will be replaced by the FileSaver information.

6 Click Proceed to copy the information to the disk.

After Volume Recover is finished, it displays one of two dialog boxes.

- If you used a FileSaver file and the procedure worked, Volume Recover rewrites the driver area of the hard drive and you must restart following the recovery.
- If you used Rebuild Directories, the disk is mounted, and you can continue working.

7 If the restore was successful, copy any critical files from the restored disk to some other disk.

Troubleshooting

Beyond using Norton Utilities, there are some other basic things you can do to try to fix your Macintosh.

If Disk Doctor and UnErase are unable to solve your problems:

- Check all cables for loose connections. See "Check all cables" on page 24.
- Reset PRAM by restarting with Command-Option-P-R held down.
- Disconnect all external devices. See "Have you added anything new lately?" on page 25.
- Update your device drivers with the latest formatting software. For more information on updating drivers, consult the device manufacturer's documentation.
- Your device might need an installed extension or Norton Utilities tools might not recognize the device disk.
- Many of the recent peripheral devices such as USB and FireWire, require specific system extensions. If you are missing the extension, a device might not function as expected. If you are trying to examine such a device while booted from the Norton Utilities CD, you might not be able to mount the device.

Things you may need

Locate the following items to assist you in the repair of your damaged disk:

- Your Norton Utilities for Macintosh CD.
- The Macintosh OS System CD or Disk Tools floppy disk.
- The application that was used to initialize your hard disk for use on a Macintosh.

  These applications are called device or disk formatting utilities. In most cases, the formatting software will be the Macintosh OS utility, Drive Setup, located on the Macintosh OS CD or Disk Tools floppy disk. If a dealer originally formatted your hard disk and did not give you a copy of the application, you may have to purchase an appropriate formatting utility.

First things first

Before you do anything, try the following suggestions. Many problems start out small and actually become bigger the more they are worked on! Take a few minutes and try the easy things first.

Isolate the problem

Often, problems are easier to find and fix if you can first isolate them from your working equipment.

In other words, if you are using more than one hard disk and only one hard disk has a problem (which is usually the case), reconfigure your computer's peripheral devices so that only the problem drive and your Macintosh are set up for the troubleshooting session. This will not only save time, but also prevent accidents from happening to trouble-free equipment.

Note: All external devices other than the one being examined should be physically disconnected from the computer.

Check all cables

It may be that your Macintosh or the hard disk is not getting power, or that they are not properly communicating with each other due to a faulty cable connection.

To check your cables:

1 With the power switched off, check all cables and connections.

Make sure that your Macintosh and its peripherals are plugged into a grounded electrical outlet, as well as connected to each other. If the Macintosh is too close to a wall, the cable connectors may be loose or the cables may be crimped and the connection not properly made.

If you are using a device that has a cable with the same type of connectors on each end, it may make a difference which end is connected to your Macintosh.

Do not substitute cables for different types of devices even if they look exactly alike. The wiring inside of the cable may be different.

2 If the computer doesn't start, check the power strip or wall outlet with an item that is known to work.

A lamp or small radio is a convenient tool for checking the power.

3 When you are certain that you have power available and all connections are snug, turn the system back on again.

If your Macintosh does not even begin to start up, you may have a hardware problem. Continue reading.

Have you added anything new lately?

The two top contenders for taking a startup drive temporarily out of service are: adding a new external device and installing software that modifies your system software.

If your problem occurred right after adding a hard disk or other peripheral device, check for device conflicts.

If your problem occurred after adding new software, refer to the software's documentation to see if any programs called system extensions or control panels were installed. These types of programs are designed to enhance your system software, but they sometimes cause conflicts with your system files, other extensions, or with a specific application. If so, you need to check for extension conflicts.

Is it a hardware problem?

Your Macintosh is probably one of the most reliable computer systems manufactured today. It's not unusual for a Macintosh to go five years and even beyond without hardware failure. However, in the unlikely event you do experience such problems, we have provided a list of things that can go wrong that utility software can't fix. If you encounter one of these problems, you most likely will need to see a qualified technician.

Hard disks

If you are having a problem with your hard disk drive that our software can't fix, chances are you have a hardware problem. Most internal or external hard disks display telltale symptoms:

- Internal and external drives

  The access or “busy” LED may have suddenly stopped working or may be flashing repeatedly. The sound the hard disk makes when it spins up and recalibrates may have changed or gone away.

  Sometimes drives experience a problem known as *stiction*. This is where the read/write assembly gets stuck to the point that the platter no longer spins. If the drive is external, sometimes a gentle “thump” can free it up long enough for you to perform a backup. This procedure is not entirely recommended nor is it a long term solution, for as soon as you turn off the drive, the problem will return.

- External drives only

  The power LED or the hard disk indicator light doesn’t light up.

  This sometimes happens when the power supply that powers the hard disk can burn out. This may mean that your data is still intact on the drive itself. Have a technician investigate. This can save time and money.

- Floppy disk drives and other removable media devices

  Macintosh floppy disk drives can become dirty to the point that they will no longer recognize an inserted floppy disk. If you experience this problem, ask your technician if your drive can be cleaned. Off the shelf drive cleaning kits are not a complete solution to this problem. Proper cleaning of a disk drive will not solve all floppy drive problems but is a good place to start. If a floppy happens to get stuck in a drive, take great care in removing it. The read/write head assembly is very delicate and most damage suffered here is not covered under Apple’s warranty plan.

  Other removable media drives may require special cleaning procedures. Refer to your manufacturer’s instructions.

- Macintosh main logic board

  Some “sad Macintosh” codes (those containing an “F” within the first eight characters) can be rectified using the Norton Utilities for Macintosh or the formatting software for your hard drive. Those that cannot usually indicate that a problem exists with ROM, RAM or elsewhere on the main logic board.

USB issues

To check for the most up-to-date solutions, check out the Symantec Support Services Web site at:

http://www.symantec.com/support.html

Using USB devices as startup disks

Some USB devices cannot be used as bootable volumes on some Macintosh computers. If this is the case for your system, install Norton AntiVirus for Macintosh or Norton Utilities for Macintosh (NUM) onto the USB volume (be sure to include the Norton Shared Lib file in the same folder as the NUM applications), and then start your computer with the USB media inserted and the Macintosh OS CD as the boot volume. Insert the USB media prior to restarting from the Macintosh CD so that the operating system can add the USB volume to the desktop.

Problems starting from the CD with USB devices connected

You are attempting to start an iMac DV (slot-loading model) or a Macintosh G4 with a USB port, from the new Mac OS 9-based versions of our CDs. During the startup process the computer stops responding or the computer crashes with a Bus error. This usually occurs if you have a USB hub, or solitary extra USB device, like a modem or scanner, connected in addition to your keyboard and mouse.

Disconnect the extra third-party USB device from the computer and try starting from the CD again.

FireWire device problems

When you start from the Norton Utilities CD, your FireWire drive is unrecognized, and you are prompted to initialize or eject it. Because of this, you are unable to examine any LaCie USB drives or FireWire drives while booted from the Norton Utilities CD.

Start from the hard drive and use the installed version of Norton Utilities for Macintosh on the internal drive to examine those external devices.

SCSI device conflicts

The Macintosh locates and communicates with SCSI devices, such as hard disks, scanners, and CD-ROM players, by using a SCSI ID number. The SCSI devices are connected to each other, creating a chain through which the Macintosh can communicate with any device. Each device must have a unique ID from 0 (the last device in the chain) to 6 (the first device in the chain). Your Macintosh is always device number 7, the internal hard disk is usually 0, and a factory-installed CD-ROM drive is usually 3. Most external hard disks and other SCSI devices have a switch on the back with which you set the ID number.

To resolve SCSI device ID conflicts:

- Check each SCSI device to make certain that it has a unique ID number from 0 to 6.

  If two numbers are the same, reset one device to an unused number and restart.

SCSI termination problems

A terminator is a small piece of hardware that fits over the SCSI port, connects to a cable, or is part of the electronics of your SCSI device. If the SCSI chain is terminated improperly, it can hang up your computer and cause startup problems.

If you have more than one SCSI device, you must be terminated twice—at the beginning and at the end of the chain. There can be no more than two terminators in a SCSI chain.

If you have an internal SCSI hard disk, chances are that it is terminated automatically. The user guide that came with the hard disk will normally contain information on how to change its SCSI ID and how to enable or disable termination.

To resolve a SCSI termination problem:

- Check to see that the first and last device in the SCSI chain are terminated and the others are not.

Extension conflicts

An Extension is a utility program that, upon startup, alters the way your system software works. (This can include some control panels.) These programs are stored in the Extensions folder or the Control Panels folder in the System Folder.

An extension can cause a conflict with your system files, other extensions, or with a specific application.

To temporarily resolve an extension conflict:

- Hold down the Shift key while you start up your Macintosh.

  This disables all extensions until you restart your Macintosh again.

Note: This procedure disables all extensions that normally load while your Macintosh is starting up. You may observe that certain functions are temporarily disabled. However, the next time you restart your Macintosh, the functionality returns.

To eliminate the conflict:

1. To start Extensions Manager, choose Control Panels from the Apple menu, and then open Extensions Manager.
2. In the Extensions Manager window, save your current configuration by clicking the Duplicate Set button.
3. Use the Extensions Manager software to select the bare minimum number of extensions to load. To do this, choose the Basic set for your computer on the Selected Set list.
4. Restart the computer with this set. If your computer behaves normally, you've identified the problem as an extension conflict.
5. Go back to the Extensions Manager, and start adding extensions back to your Selected Set.

   For more information on system alterations, refer to your Macintosh documentation.

More troubleshooting procedures

If your problem still exists, and you have eliminated the more common sources of problems, you should begin serious troubleshooting procedures. The following procedures explain the typical things that experienced technicians might try, in the order they might try them. If your problems are simple, you won't have to go beyond the first procedure.

Replace a damaged disk driver

Replacing a disk driver is potentially dangerous because if it is done incorrectly, it will format your Startup Disk. The procedure described next is an outline of the most typical steps for replacing a driver. The exact procedure varies with each disk drive manufacturer, so you should refer to the user's guide that came with your hard disk for detailed instructions on how to update your device driver.

To replace a driver:

1. Start your Macintosh using the disk containing the setup utility that was used to format your hard disk.

   If you still get a "Sad Mac," hold down the Command, Option, Shift, and Delete keys while restarting.

2. Open the utility application.
3. After locating your volume, look for a button or feature named Update or Reinstall Driver.

   In Drive Setup, choose Update Driver from the Functions menu. In the Apple HD SC Setup application, this button is named Update.

   If an update or replace driver feature exists in the utility, select it only after you are certain of the following things:

   - The correct volume has been chosen for the driver update.
   - Updating the driver will not cause the volume to be reformatted or initialized. If the utility warns you that data will be lost, do not proceed.

Note: If you can't locate the device with the utility software, chances are that there is a hardware problem.

4. If you have successfully completed updating the driver, restart your Macintosh.
5. To ensure that no other problems exist, run Norton Disk Doctor.

Zap the PRAM (reset Parameter RAM)

The PRAM (Parameter RAM) is an area of RAM that is used to store information about your Macintosh. Part of the information stored by PRAM is needed by your Macintosh in order to locate the current startup device.

Because this information is needed each time you use your Macintosh, it is stored even when your Macintosh is turned off (a battery is activated when you shut down your Macintosh). If the information in PRAM becomes corrupted, you can clear this information and replace it with new information.

To reset PRAM:

1. Restart your computer while holding the Command, Option, p, and r keys down.
2. As the system begins a restart, you will hear the startup chime repeat. Continue holding down the keys until the chime has sounded three or more times.
3. Release the keys and the startup should complete.

Note: Since resetting the PRAM resets the memory in your computer, some System settings, such as disk cache, mouse speed, menu blinking, time zone, and others will need to be reconfigured after this procedure.

Replace damaged system files

This procedure erases any special System beep sounds that you have installed in the damaged system file.

To replace system files:

- Consult your Macintosh User's Guide and follow the procedures for performing a clean System install.

Rebuilding the Desktop

The Desktop files are invisible files that help keep track of the files on each volume. As you work with a volume, information is added to these files. If they are damaged, they can cause startup problems. Rebuild the Desktop once a month.

Norton Disk Doctor lets you use the Finder's ability to rebuild desktop files for selected disks.

Note: If the Finder crashes during rebuild, you probably have some corrupt files on the disk. Scanning with Norton Disk Doctor will find the files.

To rebuild the Desktop:

1 Start Norton Disk Doctor.

2 On the Tools menu, click Rebuild Desktop.

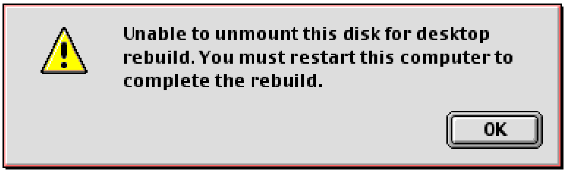
When you rebuild the Desktop, any comments you have added to the files' Get Info windows are lost, since the Desktop file containing these comments is deleted.

3 If asked to confirm, click OK.

4 If you don't want to see this alert the next time you rebuild the desktop, click Don't show this alert again.

The Desktop files of the selected volumes are made visible and moved to the Trash, and the disks are unmounted.

If any disks cannot be unmounted, you are notified.



Unable to unmount this disk for desktop rebuild. You must restart this computer to complete the rebuild.

5 Click Restart.

The desktop files are rebuilt by the Finder during startup.

If you click Continue, the unmountable volumes are remounted, and the Finder rebuilds the desktop files for those volumes.

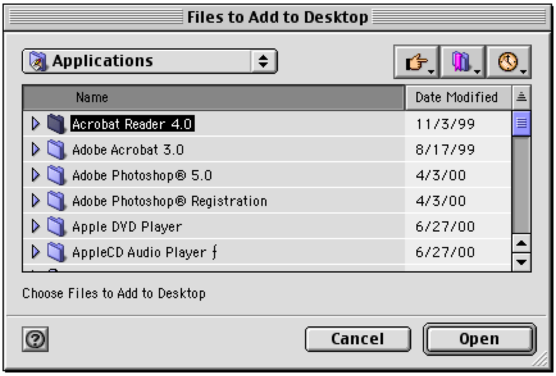
On disks with open files, the Desktop files will be rebuilt the next time the computer is restarted.

Adding a file to the Desktop

If you have a file with a generic icon, adding it to the Desktop should cause it to appear with its proper icon.

To add a file to the Desktop:

1. On the Tools menu, click Add File to Desktop.
2. In the Files to Add to Desktop dialog box, locate the file to add, and click Open.



Name	Date Modified
Acrobat Reader 4.0	11/3/99
Adobe Acrobat 3.0	8/17/99
Adobe Photoshop® 5.0	4/3/00
Adobe Photoshop® Registration	4/3/00
Apple DVD Player	6/27/00
AppleCD Audio Player ƒ	6/27/00

A message informs you that the file has been added to the Desktop.

3. Click OK.

Further options

If you are still unable to start your Macintosh using your Startup Disk, you may have a hardware problem that only a qualified service technician can fix. It may still be possible to recover files from the volume even though you may not be able to start up from it. See "Recovering erased or missing data" on page 76 for directions on how to recover data from a damaged disk.

Reformat your hard disk

A hard disk can accumulate bad or weak sectors, known collectively as "bad blocks." When this happens, some sectors can no longer be accessed unless the hard disk is "physically reformatted" or low-level formatted. This procedure should only be used if you have exhausted all repair options.

Because reformatting the hard disk will destroy all existing information contained on the disk, you must recover as much information as possible from your damaged volume before you begin reformatting. If you have a recent backup, you just need to recover new files and files that have changed since the last backup.

Almost all hard disk formatting applications deal with bad blocks differently. Some manage to re-map the blocks using spare or unused sectors during the format process while others have a special procedure that needs to be run before or after formatting. Refer to the documentation that came with the formatting software for instructions on reformatting your hard disk.

Caution: Do not format your hard disk unless you have a backup of the damaged hard drive or have successfully recovered all of the files using UnErase. See "Recovering erased or missing data" on page 76 for directions to recover data from a damaged disk.

CHAPTER

1

Installing Norton Utilities for Macintosh

This chapter describes how to install, start, and update Norton Utilities for Macintosh. See the following sections for more information:

- Step-by-step procedures for installing Norton Utilities to your Macintosh computer. See "Installing Norton Utilities for Macintosh" on page 36.
- Installing individual components of Norton Utilities for Macintosh. See "Performing a custom installation" on page 40.
- Starting Norton Utilities. See "Starting Norton Utilities for Macintosh" on page 43.
- Check for program updates with LiveUpdate. See "Updating Norton Utilities program files" on page 44.
- Keep Norton FileSaver active to help prevent disk problems. See "Keeping Norton FileSaver turned on" on page 46.

Caution: If your startup disk is damaged or contains erased files that you want to recover, do not install Norton Utilities for Macintosh. Installing may further damage or destroy files that can be recovered. Instead, start your Macintosh with the Norton Utilities for Macintosh CD, and run Norton Disk Doctor. See "Running Norton Utilities from the CD" on page 12, and "Restoring an entire disk" on page 20 for more information.

For more information about restarting from the CD to solve emergency problems, see "Troubleshooting" on page 23.

Installing Norton Utilities for Macintosh

The standard "Easy Install" automatically installs the complete Norton Utilities to your hard disk with all the default settings.

Note: Before you begin installing Norton Utilities for Macintosh, take a moment to review the Read Me file. The Read Me file contains useful information about Norton Utilities for Macintosh that is not covered in this manual.

Restarting from the CD

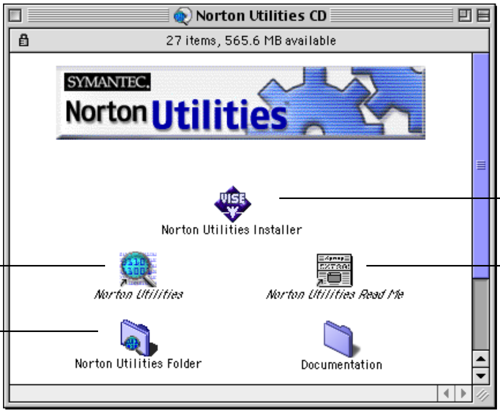
Before starting the installation, you should restart from the Norton Utilities for Macintosh CD. The Norton Utilities for Macintosh CD contains MacOS System software so it can be used as a Startup Disk to restart with no conflicting extensions loaded.

You should also examine your disk drive with Norton Disk Doctor to ensure that there are no problems before installing. For instructions on running Norton Disk Doctor from the CD, see "Running Norton Utilities from the CD" on page 12.

To restart from the CD and install Norton Utilities:

1. Insert your Norton Utilities for Macintosh CD into the CD-ROM drive.
2. Restart from your Norton Utilities CD using one of the following methods:
   - On the Special menu, click Restart, while holding down the "C" key on the keyboard.
   - On a Macintosh with a third-party or external CD-ROM drive, go to Control Panels, click Startup Disk, and select the Norton Utilities for Macintosh CD as your Startup Disk. Close the Startup Disk control panel and click Restart on the Special menu.

When you restart from the Norton Utilities for Macintosh CD, a Norton Utilities for Macintosh background pattern appears on the desktop, and the Norton Utilities CD window appears.



Double-click to run Norton Disk Doctor from the CD

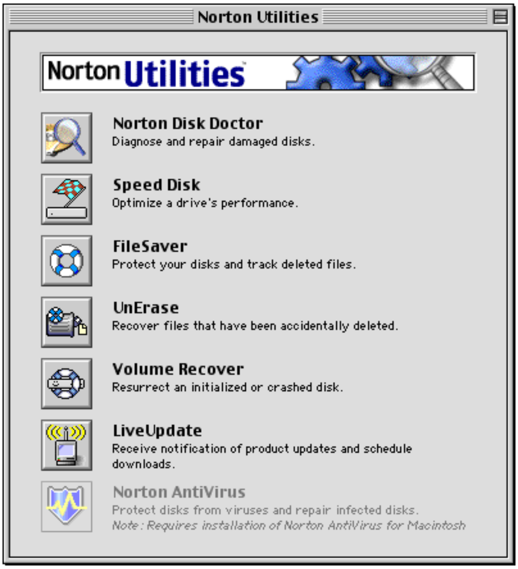
Double-click to access more tools

Double-click to install Norton Utilities

Double-click to read late-breaking news

3 In the CD window, double-click the Norton Utilities Installer icon.

The Norton Utilities for Macintosh welcome screen appears.



Norton Disk Doctor
Diagnose and repair damaged disks.

Speed Disk
Optimize a drive's performance.

FileSaver
Protect your disks and track deleted files.

UnErase
Recover files that have been accidentally deleted.

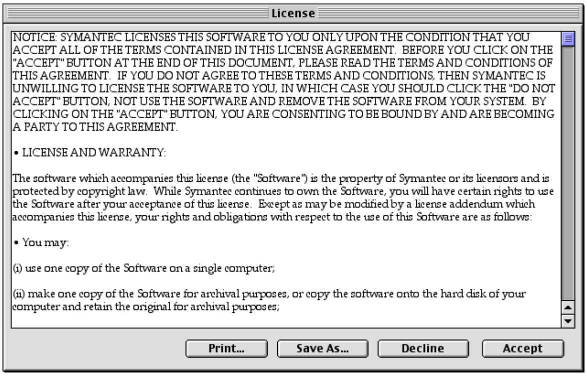
Volume Recover
Resurrect an initialized or crashed disk.

LiveUpdate
Receive notification of product updates and schedule downloads.

Norton AntiVirus
Protect disks from viruses and repair infected disks.
Note : Requires installation of Norton AntiVirus for Macintosh

Click Continue.

4 When the License Agreement appears, click Agree to accept the License and Warranty Agreement.



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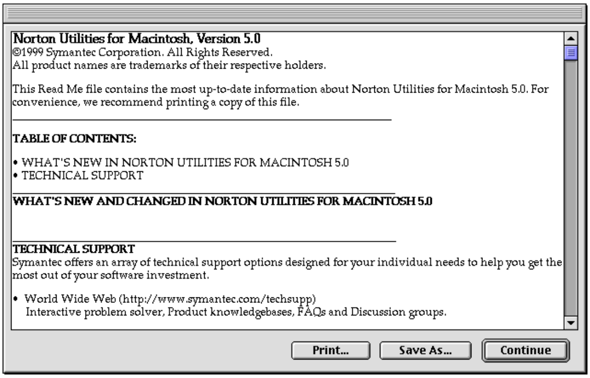
- You may:

(i) use one copy of the Software on a single computer;

(ii) make one copy of the Software for archival purposes, or copy the software onto the hard disk of your computer and retain the original for archival purposes;

If you click Disagree, the installation terminates.

5 When the Read Me dialog box appears, read through it before completing the installation.



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This Read Me file contains the most up-to-date information about Norton Utilities for Macintosh 5.0. For convenience, we recommend printing a copy of this file.

TABLE OF CONTENTS:

- WHAT'S NEW IN NORTON UTILITIES FOR MACINTOSH 5.0
- TECHNICAL SUPPORT

WHAT'S NEW AND CHANGED IN NORTON UTILITIES FOR MACINTOSH 5.0

TECHNICAL SUPPORT
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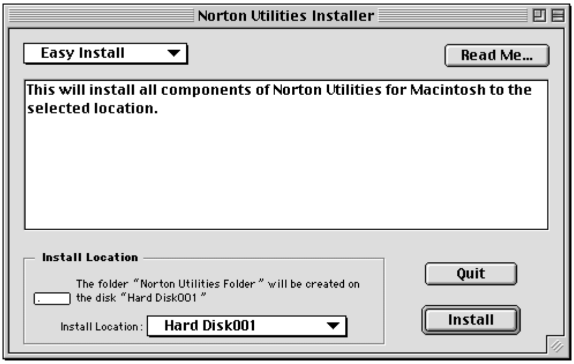
- World Wide Web (http://www.symantec.com/techsupp)
  Interactive problem solver, Product knowledgebases, FAQs and Discussion groups.

6 Scroll down the text for any information that might pertain to your configuration.

7 Click Continue.

The Easy Install dialog box appears.



This will install all components of Norton Utilities for Macintosh to the selected location.

The folder "Norton Utilities Folder" will be created on the disk "Hard Disk001"

Install Location: Hard Disk001

If necessary, change the install location.

8 Click Install.

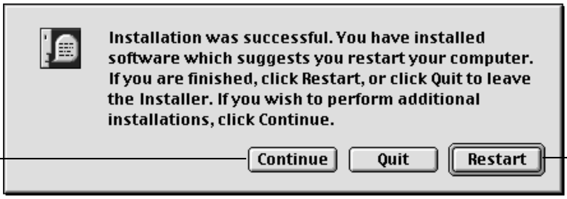
If you don't want to install the full set of Norton Utilities for Macintosh, click Custom. For more information on customizing installation, see "Performing a custom installation" on page 40.

9 Click Install.

You might need to confirm the disk you are installing to.

A progress bar shows the installation progress.

When installation is complete, you see a message.



Installation was successful. You have installed software which suggests you restart your computer. If you are finished, click Restart, or click Quit to leave the Installer. If you wish to perform additional installations, click Continue.

Click Continue only if performing multiple installs

Click to complete installation

10 Click Restart.

When your computer restarts, Norton FileSaver is loaded automatically to protect your computer from crashes and data loss.

An alias for Norton Utilities is added to your Apple menu during installation.

Note: To ensure that your computer restarts from your hard drive after installation, respecify your hard drive as the Startup Disk.

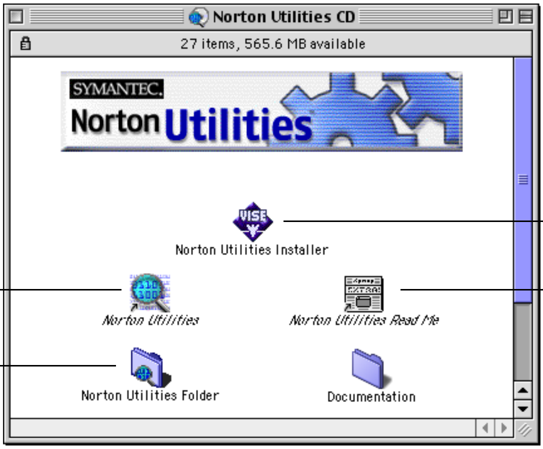
Performing a custom installation

The default Standard installation in the previous procedure is designed to provide the maximum protection for your computer and is recommended for all users. However, if you don't want to install the full Norton Utilities for Macintosh, the Custom Install option lets you install individual components.

To perform a custom installation:

1. Insert your Norton Utilities for Macintosh CD into the CD-ROM drive.
2. Restart from your Norton Utilities CD using one of the following methods:
   - On the Special menu, click Restart, while holding down the "C" key on the keyboard.
   - On a Macintosh with a third-party or external CD-ROM drive, go to Control Panels, click Startup Disk, and select the Norton Utilities for Macintosh CD as your Startup Disk. Close the Startup Disk control panel and click Restart on the Special menu.

   When you restart from the Norton Utilities for Macintosh CD, a Norton Utilities for Macintosh background pattern appears on the desktop, and the Norton Utilities CD window appears.



Double-click to run Norton Disk Doctor from the CD

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Double-click to install Norton Utilities

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3. In the CD window, double-click the Norton Utilities Installer icon.

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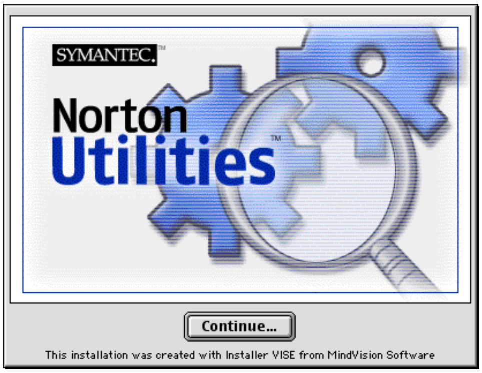
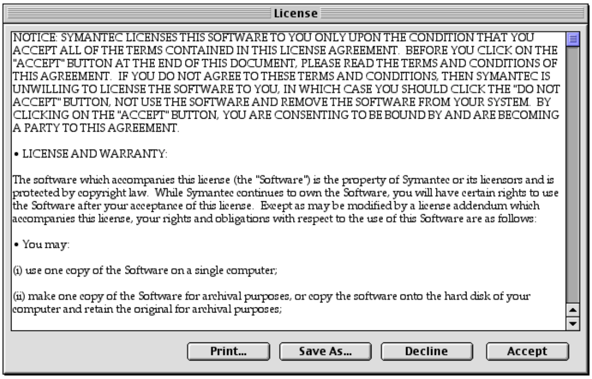


This installation was created with Installer VISE from MindVision Software

4 When the License Agreement appears, click Agree to accept the License and Warranty Agreement.



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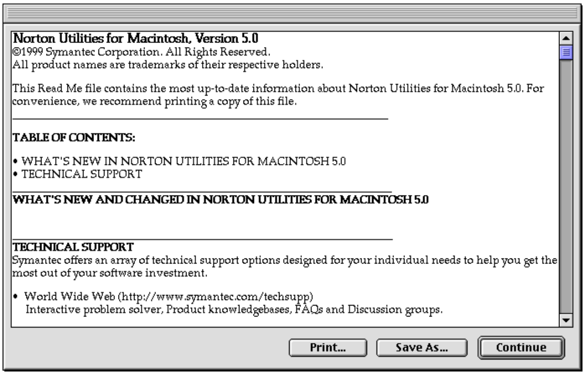

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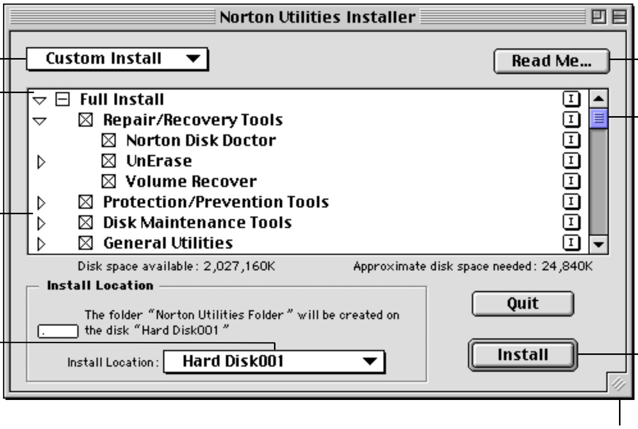
- World Wide Web (http://www.symantec.com/techsupp)
  Interactive problem solver, Product knowledgebases, FAQs and Discussion groups.

6 Scroll down the text for any information that might pertain to your configuration, then click Continue.

7 Click Custom Install in the Easy Install dialog box.



☒ Full Install
☒ Repair/Recovery Tools
☒ Norton Disk Doctor
☒ UnErase
☒ Volume Recover
☒ Protection/Prevention Tools
☒ Disk Maintenance Tools
☒ General Utilities

Disk space available: 2,027,160K

Approximate disk space needed: 24,840K

Install Location

The folder "Norton Utilities Folder" will be created on the disk "Hard Disk001"

Install Location: Hard Disk001

Click to go back to standard (full) installation

Select a group or individual components

Click to set destination of installed files

View the Read Me file

Scroll to view all components

Click to begin the installation

Resize to view more components

In the Custom Install dialog box, the tools are grouped by function.

8 Select the components you want.

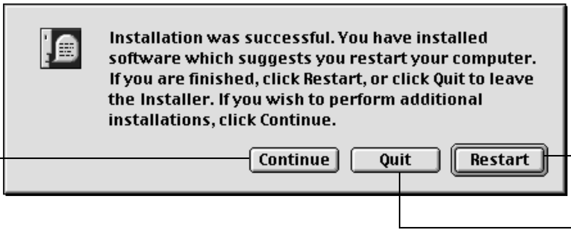
To view all the components of a group, click the group name.

9 Click Install.

You might need to confirm the disk you are installing to.

A progress bar shows the installation progress.

When installation is complete, you see a message.



Installation was successful. You have installed software which suggests you restart your computer. If you are finished, click Restart, or click Quit to leave the Installer. If you wish to perform additional installations, click Continue.

Click Continue only if performing multiple installs

Click to complete installation

Click to complete other tasks before restarting

10 Click Restart.

When your computer restarts, Norton FileSaver is loaded automatically to protect your computer from crashes and data loss.

An alias for Norton Utilities is added to your Apple menu during installation.

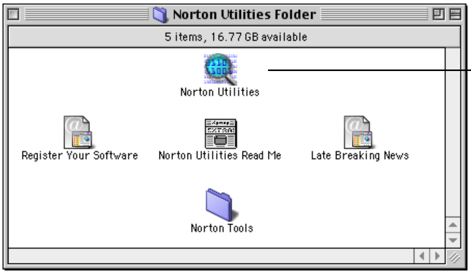
Starting Norton Utilities for Macintosh

You can start Norton Utilities from the Apple menu. Some components can be started without opening the Norton Utilities main window.

To start Norton Utilities:

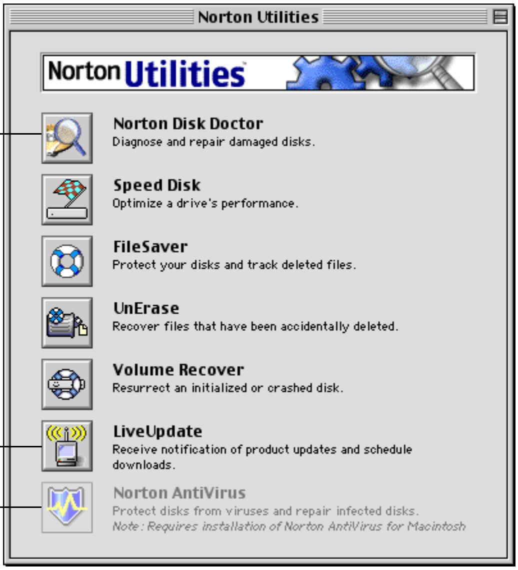
1 Do one of the following:

- Choose the Norton Utilities alias from the Apple menu.
- Locate and open the Norton Utilities folder on your hard disk. Inside the folder is the Norton Utilities icon and the Norton Tools folder. Double-click the Norton Utilities icon.



Double-click the Norton Utilities icon

The Norton Utilities main window appears.



Norton Disk Doctor
Diagnose and repair damaged disks.

Speed Disk
Optimize a drive's performance.

FileSaver
Protect your disks and track deleted files.

UnErase
Recover files that have been accidentally deleted.

Volume Recover
Resurrect an initialized or crashed disk.

LiveUpdate
Receive notification of product updates and schedule downloads.

Norton AntiVirus
Protect disks from viruses and repair infected disks.
Note: Requires installation of Norton AntiVirus for Macintosh

Click any button to start the selected tool

Run LiveUpdate to update Norton Utilities files

If you have installed Norton AntiVirus, start it from here

2. To run a Norton Utilities for Macintosh tool:
   - Click the tool button in the Norton Utilities main window.
   - Choose a tool from the Utilities menu.
   - In the Norton Utilities folder, open the Norton Tools folder and double-click the tool's icon.
3. To update Norton Utilities (and Norton AntiVirus for Macintosh if installed), click the LiveUpdate button. For more information, see "Updating program files" on page 177.
4. To start Norton AntiVirus for Macintosh (if installed on your machine) see "Accessing Norton AntiVirus for Macintosh" on page 45.

In addition to the Norton Utilities main window and Utilities menu, some Norton Utilities tools are accessible from the Control Panel.

To open a Norton Utilities Control Panel:

- Choose Control Panels from the Apple menu.

  The Norton Utilities accessible from the Control Panels include Norton FileSaver and DiskLight.

  Fast Find is available on the Apple menu.

About Norton Utilities for Macintosh installed files

For a complete list of all files installed by Norton Utilities, please refer to the Norton Utilities Read Me file on the Norton Utilities for Macintosh CD. The Norton Utilities Installer Log also lists the installed files.

Updating Norton Utilities program files

You can use LiveUpdate to update program files via your existing Internet connection. If you have Norton AntiVirus installed, LiveUpdate also checks for updates to virus definitions and program updates, and installs them automatically.

To update Norton Utilities with LiveUpdate:

1. Click the LiveUpdate button on the Norton Utilities main window.
2. In the LiveUpdate window, click Update Everything Now.
3. LiveUpdate looks for updates from Symantec's LiveUpdate server site.

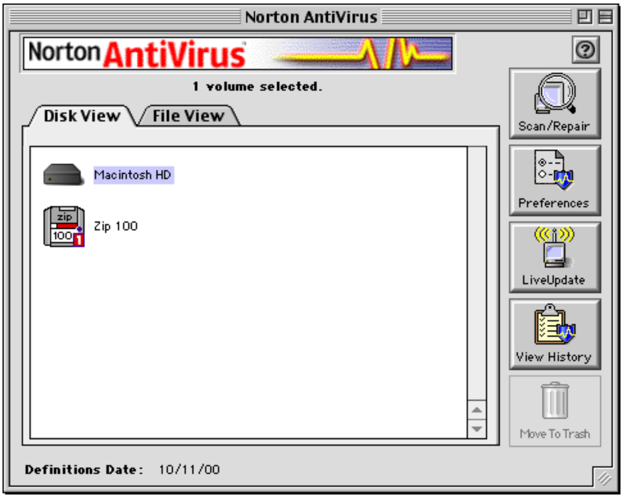
For more information, see "Updating program files" on page 177.

Accessing Norton AntiVirus for Macintosh

If you have Norton AntiVirus for Macintosh v. 6.x or greater installed on your system, you can start it from the Norton Utilities main menu.

To start Norton AntiVirus for Macintosh from the Norton Utilities window:

1 Click the Norton AntiVirus button on the Norton Utilities main window, or choose Norton AntiVirus from the Utilities menu.



2 In the Norton AntiVirus main window, select a disk and click Scan.

3 For information on running Norton AntiVirus, see the *Norton AntiVirus for Macintosh User's Guide*, or choose Norton AntiVirus help from the Help menu.

4 To return to Norton Utilities from Norton AntiVirus:

- If you have Norton AntiVirus for Macintosh v.6.x or above installed, choose Norton Utilities from the Utilities menu.
- If you have Norton AntiVirus for Macintosh v.5.x installed, you must restart Norton Utilities from the Apple menu.

Note: To purchase a copy of Norton AntiVirus, contact Symantec or your software dealer. To contact Symantec, see "Service and support solutions" on page 217.

Keeping Norton FileSaver turned on

Make sure that Norton FileSaver remains active (its default setting) when you install Norton Utilities. Norton FileSaver tracks essential information about your disk directories and system files. The FileSaver files are used by Norton Disk Doctor, UnErase and Volume Recover to repair and recover erased or damaged documents, applications, folders, and hard disks. Norton FileSaver has been carefully tested and engineered so as not to interfere with MacOS or with most Macintosh applications. To find out more about Norton FileSaver or adjust its default settings, see "Norton FileSaver" on page 131.

Using contextual menus

You can access Norton Utilities commands from anywhere in the Finder using contextual menus. You access contextual menus via the Control key on your keyboard.

The following Norton Utilities commands are available on the Norton contextual menu:

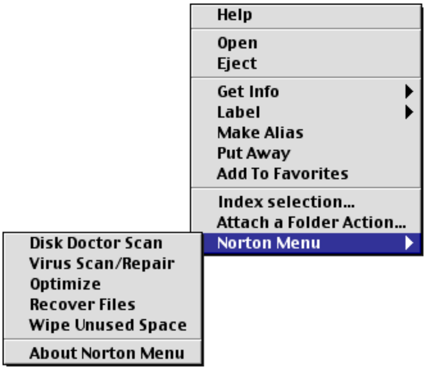
- Disk Doctor Scan: Launches Norton Disk Doctor and examines the selected disk for problems. This command is only available when you have a disk selected.
- Optimize: Launches Speed Disk and optimizes the selected disk.
- Defragment: Launches Speed Disk and defragments the selected files.
- Recover Files: Launches UnErase, performs a quick search, and shows the files found.
- Wipe/Wipe Unused Space: Launches Wipe Info and wipes the selected file or folder. If a disk is selected, the unused free space is wiped.

To use the contextual menu:

1. Hold down the Control key and click anywhere on the Desktop.

   Depending on where you click, different options appear on the menu.

2 Click Norton Menu.



If the command you need does not appear on the submenu, try Command-clicking a different item in the Finder.

What's next?

Once you have installed Norton Utilities for Macintosh, you can do one or more of the following:

- If you are new to Norton Utilities for Macintosh, see "Before you begin" on page 11 to learn the basics.
- To make sure your disks are in top condition, scan with Norton Disk Doctor. See "Using Norton Disk Doctor" on page 52 for details.
- Run Speed Disk to optimize hard disk space and improve overall system performance. For more information, see "Speed Disk" on page 103.

Registering Norton Utilities for Macintosh

With your existing Internet connection you can register Norton Utilities for Macintosh via the Internet.

If you are running Mac OS 8.5 and above, an icon in the Norton Utilities folder lets your launch your browser and connect to Symantec's software registration page. If you are running a lower version of Mac OS, you can point your browser to the Symantec Web page:

www.symantec.com/product/home-mac.html

To register via the Internet:

1. Connect to the Internet in your usual way.

   If you use America Online (AOL) to connect to the Internet, see "Connecting to the Symantec Web site through America Online" on page 50.

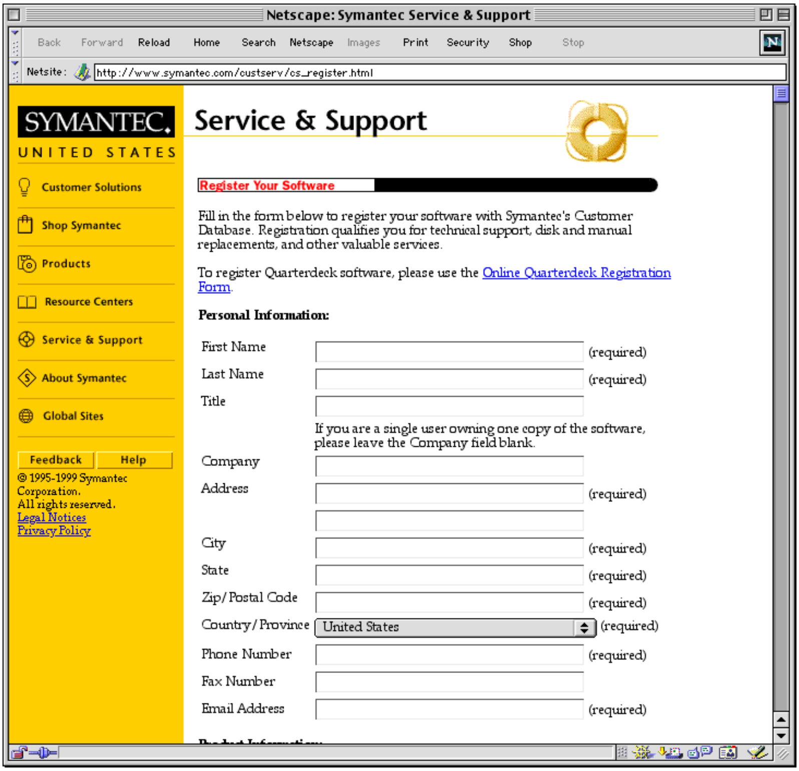
2. In the Norton Utilities folder, double-click Register Your Software.

   Your default Internet browser should go to the Symantec Web registration page.

   If you are using Mac OS 8.1, start your browser and navigate to the Symantec Web page:

   www.symantec.com/custserv/cs_register.html

3 In the Symantec Service & Support window, type the required information.



http://www.symantec.com/custserv/cs_register.html

Service & Support

Register Your Software

Fill in the form below to register your software with Symantec's Customer Database. Registration qualifies you for technical support, disk and manual replacements, and other valuable services.

To register Quarterdeck software, please use the Online Quarterdeck Registration Form.

Personal Information:

First Name		(required)
Last Name		(required)
Title		
	If you are a single user owning one copy of the software, please leave the Company field blank.	
Company		
Address		(required)
City		(required)
State		(required)
Zip/Postal Code		(required)
Country/Province	United States	(required)
Phone Number		(required)
Fax Number		
Email Address		(required)

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Privacy Policy

4 If your monitor doesn't display the entire form, scroll to answer all of the questions.

5 When you are finished, click Submit Registration.

6 Close your browser.

Reading Late Breaking News

Norton Utilities installs a Late Breaking News link in the application folder. This link lets you see the latest information available for your installed software.

To read Late Breaking News:

1 Connect to the Internet in your usual way.

If you use America Online (AOL) to connect to the Internet, see "Connecting to the Symantec Web site through America Online" on page 50.

2 In the Norton Utilities folder, double-click Late Breaking News.

Late Breaking News

Your default Internet browser should go to the Symantec Web Late Breaking News page for your product.

3 If you are using Mac OS 8.1, start your browser and navigate to the Symantec Web page:

www.symantec.com/product/home-mac.html

Connecting to the Symantec Web site through America Online

If you use America Online (AOL) as your Internet Service Provider (ISP), you must connect to AOL before you go to the Symantec Registration Web site. Use the following procedure to register.

Follow this procedure after you have installed your Norton Utilities software.

To register your software via AOL:

1. Log on to AOL in your usual way.
2. On the AOL Welcome page, click the AOL Internet browser.
3. Minimize the AOL browser and any other open AOL windows.
4. In the Norton Utilities window, double-click Register Your Software.
5. Follow the procedure from "Registering Norton Utilities for Macintosh" on page 47 to enter registration information.
6. Click Submit Registration.
7. Disconnect from AOL.

CHAPTER 2

Norton Disk Doctor

Norton Disk Doctor diagnoses and repairs damaged hard disks, removable media, and floppy disks.

Norton Disk Doctor runs a series of tests on your selected hard and floppy disks to determine the health of your disks. In addition to checking the areas of your disk that store your directory and file information, Norton Disk Doctor also checks critical partition information. When Norton Disk Doctor finds repairable problems, it gives you the option of correcting them. When the tests are complete, Norton Disk Doctor generates a report about your disk.

If Norton FileSaver files exist for your disk, Norton Disk Doctor uses them to repair some types of damage. If Norton Disk Doctor cannot repair your disk, you can start Volume Recover. Volume Recover can recover badly damaged disks.

This chapter explains how to use Norton Disk Doctor to:

- Diagnose and repair disks and repair or recover damaged files. For more information, see “Using Norton Disk Doctor” on page 52.
- View disk reports. For more information, see “Viewing the disk report” on page 60.
- Look for missing disks. For more information, see “Selecting missing disks” on page 61.
- Get information on a disk. For more information, see “Viewing and changing file, folder, or disk information” on page 64.
- Set Norton Disk Doctor preferences. For more information, see “Setting preferences” on page 72.

You can set up Norton Disk Doctor to match your level of expertise—it can fix disks automatically or you can use it to explore the technical aspects of your damaged disk.

Warning: Do not install Norton Utilities for Macintosh to a damaged disk. See “Restoring an entire disk” on page 20 for instructions on how to proceed.

Before you begin

When you install Norton Utilities with the default settings, Norton FileSaver runs in the background, monitoring your mounted drives. If it detects a potential problem, it prompts you to run Norton Disk Doctor. Whenever you see such a warning, you should run Norton Disk Doctor immediately.

Although Norton FileSaver and Norton Disk Doctor both check your disks for disk structure problems, Norton Disk Doctor performs a more comprehensive check of file-level problems. Therefore, you should examine your disks with Norton Disk Doctor regularly—for example, before your weekly backup. You should also run Norton Disk Doctor before you run Norton Speed Disk.

- If you think there may be a problem with your disk, for example, if the files or folders that you worked with yesterday do not appear today, or you cannot start an often-used application, run Norton Disk Doctor.
- If your startup disk is damaged, see “Restoring an entire disk” on page 20 for instructions on using the Norton Utilities CD to start up your Macintosh and run Norton Disk Doctor.

  Because disk problems may have more than one cause or can be caused by hardware damage—something no software package can repair—you may want to read “Troubleshooting” on page 23 before trying to repair your disk.

Using Norton Disk Doctor

If this is an emergency situation, see “Running Norton Utilities from the CD” on page 12 for instructions on using Norton Disk Doctor to repair your disk.

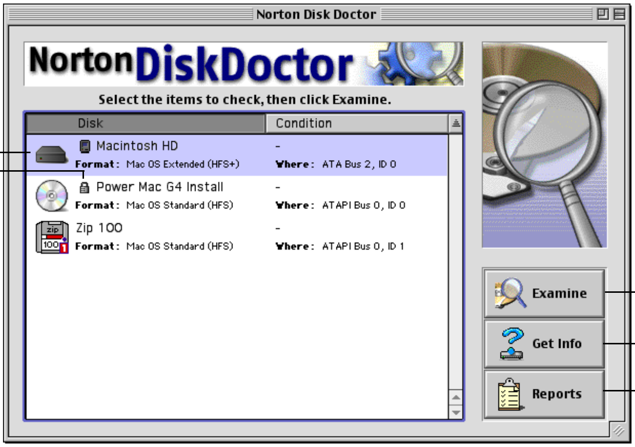
Tip: To launch Norton Disk Doctor and examine a disk immediately, use the contextual menu. Hold down the Command key and click the disk you want to examine, then click Disk Doctor Scan. You can also drag one or more disk icons from the Desktop to the Norton Disk Doctor icon.

To start Norton Disk Doctor:

1. Click the Norton Disk Doctor button in the Norton Utilities main window.

   You can also double-click the Norton Disk Doctor icon in the Norton Tools folder.

   The Norton Disk Doctor main window appears.



Select the items to check, then click Examine.

Disk	Condition
Macintosh HD Format: Mac OS Extended (HFS+)	- Where: ATA Bus 2, ID 0
Power Mac G4 Install Format: Mac OS Standard (HFS)	- Where: ATAPI Bus 0, ID 0
Zip 100 Format: Mac OS Standard (HFS)	- Where: ATAPI Bus 0, ID 1

Select one or more disks to examine

Small icons indicate disk status

Click to begin testing selected disks

Click to see more information about a selected disk

Click to see a completed report

2. In the Norton Disk Doctor main window, select one or more disks and click Examine.

   - Shift-click to select more than one disk.
   - To examine a floppy disk, insert it into an available floppy disk drive. It will appear in the list even if it does not appear on the desktop.

Tip: The Finder will sometimes try to eject a badly damaged floppy disk, or may crash when the disk is inserted. To add a floppy disk to Norton Disk Doctor's list without the Finder seeing it, hold down the Option key when you insert the disk. The floppy disk will not appear on the Desktop.

The small icons to the right of the disk icons indicate each disk's potential for examination and repair:

Macintosh icon	The disk contains the active System files and some repair functions will be limited.

Application icon	The disk contains the Norton Disk Doctor application and some repair functions will be limited.
Lock icon	The disk is write-protected and Norton Disk Doctor can examine the disk, but cannot perform any repairs on it.

Note: If you do not see the disk you're looking for in the list, your disk may not be mounted, or it may be damaged. Choose Show Missing Disks from the Disks menu. For more information, see "Selecting missing disks" on page 61. If you see a disk without a name or with a name you do not recognize, select the disk and click the Get Info button, or choose Get Info from the File menu. The Get Info window displays information about the selected disk that may help you identify it. For more information, see "Viewing and changing file, folder, or disk information" on page 64.

If you restarted from the CD (or have set your Preferences to Always Ask For An Undo File Location) Norton Disk Doctor may prompt you to choose a location for Undo files.

The Undo file lets you attempt to undo Norton Disk Doctor repairs and return your hard disk to the state before Norton Disk Doctor repaired the damage it found. Because Norton Disk Doctor repairs directories during its examination, it is possible that a repair may cause an unwanted result. Not all repairs are undoable.

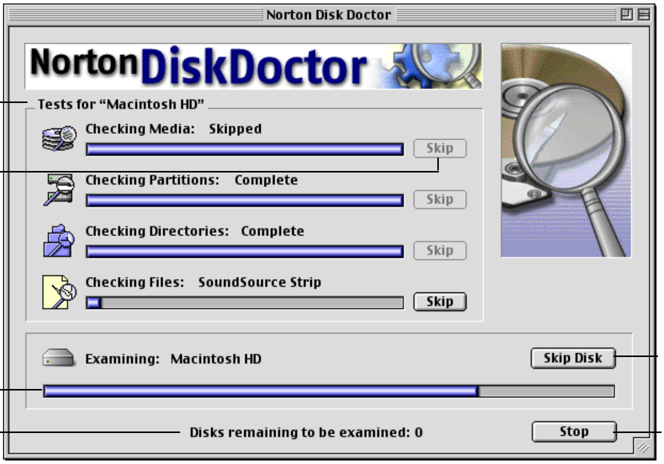
3 Select a folder and click Choose.

You should save the Undo file to a disk other than the one you are examining. By default, Norton Disk Doctor saves the Undo files at the root level of the boot drive, in a folder called NDD Undo Files.

Norton Disk Doctor checks every area of your disk, looking for problems that need immediate attention as well as file problems that could give you problems in the future.

Tip: For a description of the tests, see "About Norton Disk Doctor tests" on page 56.

The progress window shows Norton Disk Doctor’s progress as it examines each selected disk for errors.



Tests for “Macintosh HD”

Checking Media: Skipped

Checking Partitions: Complete

Checking Directories: Complete

Checking Files: SoundSource Strip

Examining: Macintosh HD

Disks remaining to be examined: 0

Name of disk being examined

Click Skip to skip a test

Progress of overall examination

Number of disks to be examined

Skip one disk in a series being examined

Stop examining all disks

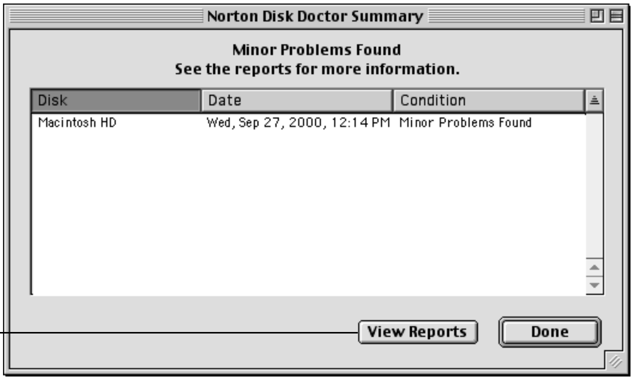
4 You can do the following in the progress window:

- Click Skip to skip an individual test.
- Click Skip Disk to skip the remainder of tests for this disk.

  If another disk is selected, Norton Disk Doctor proceeds to examine it.
- Click Stop to stop examining all disks.

5 If a problem is found, Norton Disk Doctor displays a Problem alert to which you must respond. For more information, see “Responding to problems” on page 57.

When the examination is completed, Norton Disk Doctor displays the summary.



Minor Problems Found
See the reports for more information.

Disk	Date	Condition
Macintosh HD	Wed, Sep 27, 2000, 12:14 PM	Minor Problems Found

Click to view Norton Disk Doctor report

6 To view the report, click View Reports. Norton Disk Doctor displays the report, which you can view onscreen, print, or save to another file. For information on Norton Disk Doctor reports, see "Viewing the disk report" on page 60.

Tip: If you are concerned about making a repair decision, click Skip in response to Norton Disk Doctor repair dialog boxes. After the disk examination is finished, print the Norton Disk Doctor Report for reference before running Norton Disk Doctor again.

About Norton Disk Doctor tests

The following tests are performed for each selected disk. You can run any test independently of the others.

To select tests:

1. On the Edit menu, choose Preferences.
2. Select the tests to run. See the following table for descriptions of the kinds of tests performed by Norton Disk Doctor.
3. Click OK.

Test	Description
Media	This test checks the disk surface areas, called blocks, for damage. A bad block is any block that cannot safely store data. If a file occupies a bad block and there is sufficient space on the disk, Norton Disk Doctor moves the file's data, if possible, to a free space on the disk. Bad blocks are then marked off so no new data is stored there. Also use this option to test floppy disks because floppy disk media is more susceptible to failure than that of a hard disk. Because this test is time-consuming, you may want to save time by using this option the first time you check your hard disks and only periodically thereafter. You can turn off the option in the Preferences dialog box.
Partitions	This test checks and verifies physical disk structures and data, including the Driver Descriptor Map, Partition Maps, and the device driver.

Test	Description
Directories	Select this option to test the physical and logical disk structures. You should always run this test. Norton Disk Doctor checks and later verifies parts of the directory, including logical disk structures such as the extents tree and the catalog tree. Then it checks and verifies the extents tree records and catalog tree records. These structures keep track of where files are stored on disk. The test also checks and verifies critical disk directory structures such as the Master Directory Block (MDB) and Volume Bit Map (VBM) on HFS volumes, or the Volume Header Block (VHB) and Allocation file on HFS Plus volumes. It also checks for cross-linked files (files that share one or more of the same blocks).
Files	This test checks for multiple sets of System and Finder files, incorrectly set or unset Bundle Bits and Custom Icon Bits for files and applications, file corruption, and incorrect date information. You can also check for names beginning with a period, and null characters in file names. You can select the type of file damage that Norton Disk Doctor checks for. Damage found by selecting Bundle Bit, Custom Icon, or Invalid Dates is limited to the affected files, so you may occasionally want to turn off these options to save time. You should leave Damaged Resource Fork selected, as a file with this damage can cause your Macintosh to crash.

Note: For more information about disk and drive technology, see “Norton Disk Companion” on page 191, which has a thorough discussion of fixed disks and other media.

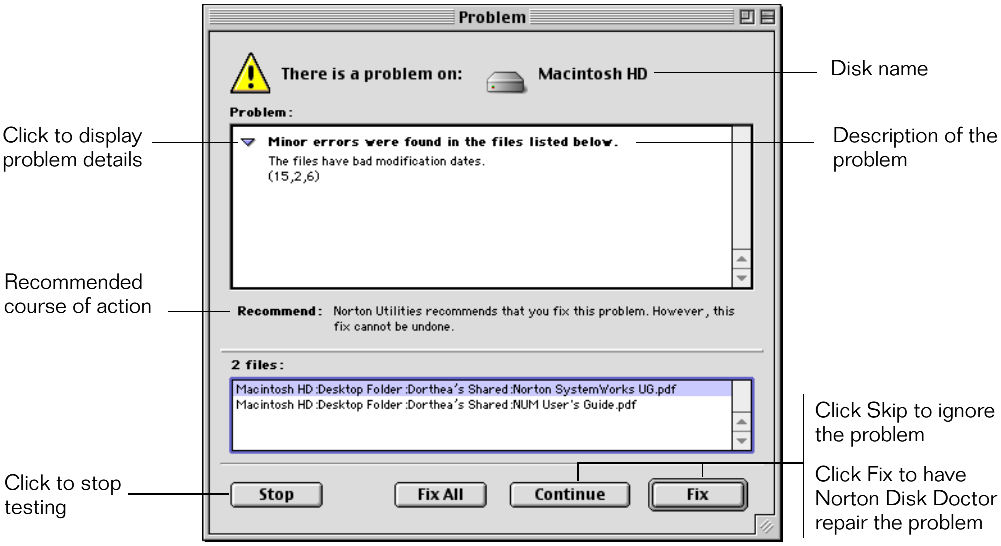
Responding to problems

When Norton Disk Doctor finds a problem, it displays a Problem dialog box describing the type of error and the files or other disk elements affected.

Note: For more information about some problems found by Norton Disk Doctor, see “Norton Disk Doctor error messages” on page 183.

To respond to problems:

1 When Norton Disk Doctor displays a problem dialog box, read the problem description and, if the problem can be fixed, the recommended action.



There is a problem on: Macintosh HD

Problem:

Minor errors were found in the files listed below.
The files have bad modification dates.
(15,2,6)

Recommend: Norton Utilities recommends that you fix this problem. However, this fix cannot be undone.

2 files:

Macintosh HD:Desktop Folder:Dorthea's Shared:Norton SystemWorks UG.pdf
Macintosh HD:Desktop Folder:Dorthea's Shared:NUM User's Guide.pdf

Disk name

Click to display problem details

Description of the problem

Recommended course of action

Click Skip to ignore the problem

Click Fix to have Norton Disk Doctor repair the problem

Click to stop testing

2 You have the following options:

- Stop

  Norton Disk Doctor stops examining altogether.

- Continue

  Norton Disk Doctor continues examining the disk but does not fix the problem.

- Fix

  Norton Disk Doctor repairs the problem and continues running the rest of the tests.

- Fix All

  Norton Disk Doctor repairs the problem in all the displayed files.

3 If Norton Disk Doctor detects damage it cannot repair, but that may be corrected by Volume Recover, it displays a dialog box from which you can run Volume Recover. You can use Volume Recover to rebuild damaged directories and restore FileSaver information. For more information, see "Volume Recover" on page 95.

Note: If a disk was not originally mounted on the Desktop, Norton Disk Doctor may need to mount it when the examination is finished. It might be necessary to restart the computer in order for the changes Norton Disk Doctor has made to take effect. If Norton Disk Doctor displays a dialog box asking to load the driver, click OK to let the driver be loaded and the disk mounted. It may also display a message saying that it is not able to complete the examination. Also, in some cases, it may be necessary to reinstall the driver for the disk to work properly. See your hardware or software driver documentation for information on installing or updating your driver.

If Norton Disk Doctor can’t repair a problem

Occasionally, a disk or a file is so severely damaged that no software program can fix it. If a disk is badly damaged, Norton Disk Doctor displays a dialog box that tells you to back up the disk and reformat it. If a file is badly damaged you can try to recover its contents with UnErase.

When Norton Disk Doctor can’t repair a problem:

1. Start Volume Recover and try the Rebuild Directories feature. For more information, see “Rebuilding directories” on page 100.
2. Back up the disk and check to see if files are missing from the disk.

   Usually, when a disk is damaged so badly that Norton Disk Doctor can’t repair it, you will not be able to mount it. You may have to use UnErase to rescue your essential data off the disk.
3. Use UnErase to look for additional files. You may need to perform a Customized Search to recover portions of your data. For more information, see “Recovering erased or missing data” on page 76.

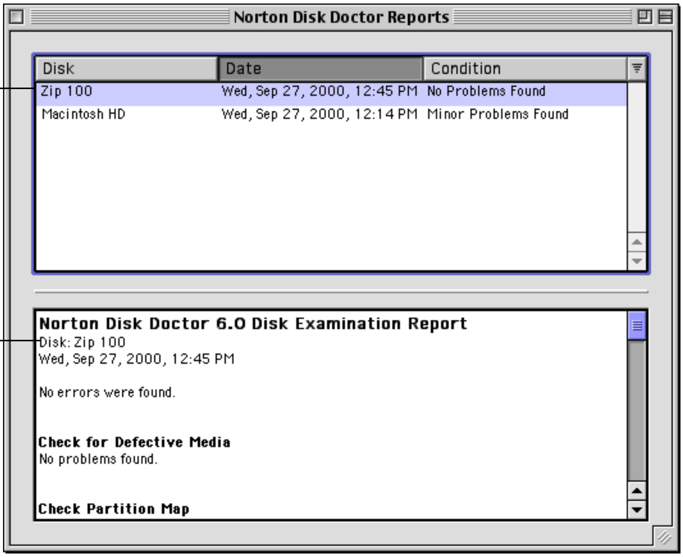
Viewing the disk report

Norton Disk Doctor keeps a record of the disks you have examined.

To view a Norton Disk Doctor report:

1 In the Norton Disk Doctor window, click Reports.

The Norton Disk Doctor Reports window appears.



Select a report

View selected report's contents

Disk	Date	Condition
Zip 100	Wed, Sep 27, 2000, 12:45 PM	No Problems Found
Macintosh HD	Wed, Sep 27, 2000, 12:14 PM	Minor Problems Found

Norton Disk Doctor 6.0 Disk Examination Report
Disk: Zip 100
Wed, Sep 27, 2000, 12:45 PM

No errors were found.

Check for Defective Media
No problems found.

Check Partition Map

2 In the top part of the window, select the disk whose report you want to view.

The content of the selected report appears in the lower part of the window.

Scroll down to view the entire contents of the report.

3 Click the close box to return to the main Norton Disk Doctor window.

4 To print the selected report, choose Print from the File menu.

Tip: Each stored report uses a small amount of disk space. Periodically delete reports that are no longer needed.

To delete a report:

- In the Norton Disk Doctor Reports window, select the report and then choose Clear from the Edit menu, or just press the Delete key.

Selecting missing disks

If a disk is extremely damaged or has a hardware problem, it may not appear in the list of disks to diagnose. If you do not see the disk you want, use the Disks menu commands. In this procedure, you can try re-scanning the device chain for more volumes. If the disk still does not appear, search for it by characteristics.

To scan for missing disks:

1. Before you start, verify that the hardware is correctly connected and turned on. For suggestions on hardware troubleshooting, see "Is it a hardware problem?" on page 25.
2. Choose Show Missing Disks from the Disks menu.

   Norton Disk Doctor scans for additional disks. If the disk is found, it appears in the list of disks. Some removable media devices might not yet have spun up to operating speed when the device chain was first scanned.

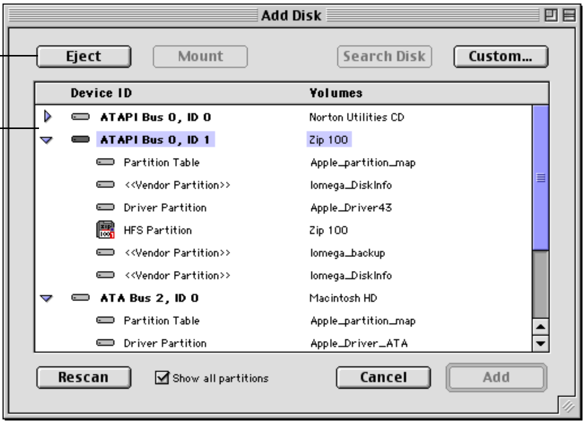
   Some other types of disks, such as FireWire and USB devices, may not show up in the list. These disks can be accessed through the Add Disks dialog.

To search for missing disks by device:

Use this procedure if the disk is still not found, and you suspect it's damaged.

1. Choose Add Custom Disks from the Disks menu.

Norton Disk Doctor searches for disks by device ID numbers and displays any results in the Add Disk dialog box.



Device ID	Volumes
ATAPI Bus 0, ID 0	Norton Utilities CD
ATAPI Bus 0, ID 1	Zip 100
Partition Table	Apple_partition_map
<<Vendor Partition>>	Iomega_DiskInfo
Driver Partition	Apple_Driver43
HFS Partition	Zip 100
<<Vendor Partition>>	Iomega_backup
<<Vendor Partition>>	Iomega_DiskInfo
ATA Bus 2, ID 0	Macintosh HD
Partition Table	Apple_partition_map
Driver Partition	Apple_Driver_ATA

Click to eject a removable disk

Displays the partitions on a device

The Add Disk dialog box displays a list of all available devices from which you can search further. You can also try other search methods from this window.

2 Do the following:

- Click a device’s name to select it.
- Click the triangle next to a device icon to display all its associated volumes (disks) and partitions.

The following buttons are available in this window:

Eject	Click this button if you want to change to a different removable media item, such as a Zip, Jaz, or Orb disk.
Mount	Click this button if you want to attempt to mount the selected device. This command can be useful if you want to make a disk available that is not damaged, but is not appearing on the desktop.
Search Disk	When you select a device and click Search Disk, Norton Disk Doctor searches an entire device looking for volumes, providing access to volume partitions that otherwise might be unavailable.

Rescan	Norton Disk Doctor looks at all available drives. If a device—such as a removable drive—was not spun up and had not “reported in” the time you first ran Norton Disk Doctor, this option may succeed in locating the missing device. The device icon is dimmed if it is unavailable. If the device is removable, make sure the media is inserted.
Show All Partitions	Select this checkbox to make sure unmounted partitions appear in the window and are available for searching. Then be sure to click the triangle next to the listed devices to display their partitions. Selecting this option also ensures that hidden partitions containing the disk driver and other structures are displayed when you click the device’s triangle.

3 If your volume appears in the window, select the missing disk and click Mount or Add.

If the device is not located:

1 Click Rescan.

Norton Disk Doctor examines the disk again.

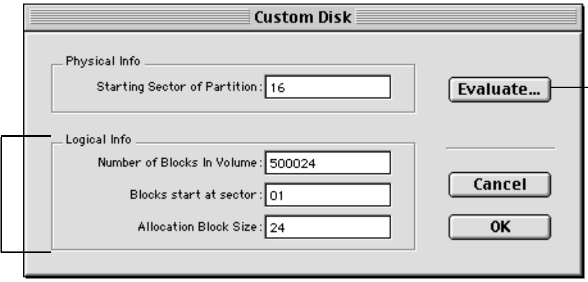
2 If the device is listed, select the missing disk and click Add.

The selected volume appears in the Norton Disk Doctor main window.

If you’ve tried all other options:

1 Once you have tried all other options and the missing disk still does not appear in the window, click Custom.

The Custom Disk dialog box appears.



Starting Sector of Partition: 16

Number of Blocks In Volume: 500024

Blocks start at sector: 01

Allocation Block Size: 24

Click to estimate the validity of the values you enter

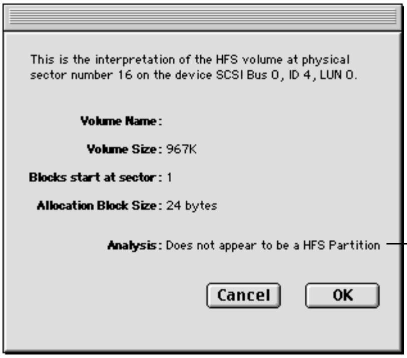
Enter logical disk information

The Custom Disk dialog box lets you specify the structural parameters for the disk volume you want to recover. It includes the starting sector of the partition, the number of blocks in the volume, the allocation block size, and the first block in the volume bitmap.

2 Enter data in the Physical Info and Logical Info areas, if you know them.

3 Click Evaluate to view an estimated level of confidence that your entered parameters match the structure of the disk you're searching.

The evaluation dialog box appears.



This is the interpretation of the HFS volume at physical sector number 16 on the device SCSI Bus 0, ID 4, LUN 0.

Volume Name:

Volume Size: 967K

Blocks start at sector: 1

Allocation Block Size: 24 bytes

Analysis: Does not appear to be a HFS Partition

Describes chance of searching on selected volume

4 Click OK to close the evaluation dialog box.

Note: If you can't find the device containing the disk you want, even using this dialog box, it's likely that there is a hardware problem. This may be a cabling or termination problem, a SCSI conflict, or a more serious physical problem with this device. If the device is FireWire or USB, a specific driver might be required in order for that drive to be usable.

Viewing and changing file, folder, or disk information

You may need to review or change various characteristics of your disks, applications, files, or folders. The Get Info command in Norton Disk Doctor displays information about the selected disk. The Get Info For command displays information about applications, files, or folders. Changes made in these dialog boxes are permanent and will remain until you or the System changes them.

Caution: Do not change Finder flags, Creator, and Type unless you know what you are doing. These characteristics should not be changed randomly.

To view information for a disk:

1. In the Norton Disk Doctor main window, select the disk for which you want information.
2. Click Get Info.

   You can also choose Get Info from the File menu.

   The Get Info window appears with details of the disk. For details, see "Disk information" below.
3. Change the desired options and close the window.

   The new attributes are saved when you close the window.

To view information for a file or folder:

1. Choose Get Info For from the File menu.

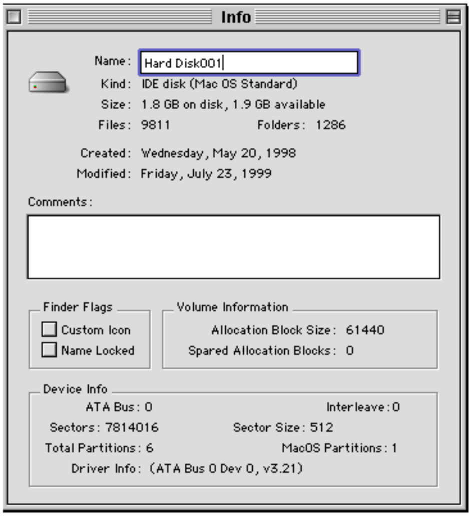
   You can also click the Get Info button.
2. In the dialog box that appears, select the file or folder, and click Open.

   The Info window appears with details of the file or folder.
3. Change the desired options and close the window.

   The new attributes are saved when you close the window.

Disk information

Norton Disk Doctor's Get Info dialog box displays assorted information about your disk, such as its Finder flags, the number of spared blocks and allocation block size, and miscellaneous device information.



Name: Hard Disk001
Kind: IDE disk (Mac OS Standard)
Size: 1.8 GB on disk, 1.9 GB available
Files: 9811 Folders: 1286
Created: Wednesday, May 20, 1998
Modified: Friday, July 23, 1999
Comments:

Finder Flags
☐ Custom Icon
☐ Name Locked

Volume Information
Allocation Block Size: 61440
Spared Allocation Blocks: 0

Device Info
ATA Bus: 0 Interleave: 0
Sectors: 7814016 Sector Size: 512
Total Partitions: 6 MacOS Partitions: 1
Driver Info: (ATA Bus 0 Dev 0, v3.21)

General disk information

The name of the disk you selected; the kind of a disk or device drive it is, such as an HFS, HFS Plus, SCSI, ATA, USB, FireWire, or floppy disk, or disk accessed over a network; the size; the amount of used and free space on disk; the total number of files and folders on the disk; the dates the disk was created and last modified, and any disk comments. You can insert new comments here that will appear in the Finder Get Info dialog box.

Finder flags

Indicates whether the disk has a customized icon, and whether the disk name is locked, or can be renamed from the Finder. If it is locked, you cannot assign a customized icon to it.

Volume information

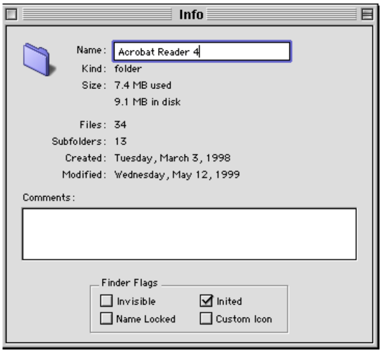
- Allocation Block Size: The number of allocation blocks on the disk.
- Spared Allocation Blocks: The number of defective allocation blocks spared on the disk. These blocks cannot be written to. If this number is not zero, you should consider reformatting your disk.

Device Info

Item	Description
SCSI BUS	(SCSI disks only) Which SCSI bus this device is on.
SCSI ID	(SCSI disks only) The SCSI ID number of the disk.
LUN	Which logical unit this device is.
Sectors	The number of sectors on the entire disk.
Sector Size	The number of bytes, usually 512 bytes, in each sector on the disk.
Total Partitions	The number of partitions on the disk.
Mac OS Partitions	The number of Macintosh OS partitions (logical volumes), excluding hidden partitions used to store the disk's driver information and other information on the disk.
Interleave	The interleave on this disk. Interleave is set by the formatting software when the disk is formatted.
Factory Defects	(SCSI disks only) The number of bad sectors on the disk mapped out at the factory.
User Defects	(SCSI disks only) The number of bad sectors mapped out since the disk left the factory. User defects are cumulative. Every time you format a disk, any new bad sectors are added to this list.
Driver Info	The information displayed when you use the Get Information feature on the driver installed on the disk. The driver can return anything or nothing. Information commonly returned includes the manufacturer's name, the version number of the disk, and the ID of the disk.

Folder information

Norton Disk Doctor’s Get Info dialog box displays assorted information about your folder, such as its size, the number of files it contains and its Finder information.



Name: Acrobat Reader 4
Kind: folder
Size: 7.4 MB used
9.1 MB in disk
Files: 34
Subfolders: 13
Created: Tuesday, March 3, 1998
Modified: Wednesday, May 12, 1999
Comments:

Finder Flags
☐ Invisible
☑ Inited
☐ Name Locked
☐ Custom Icon

General information

- Name: The name of the folder you selected.
- Kind: Folder.
- Size: The amount of data contained in all the files in the folder, and the amount of disk space used to hold these files. The second number is larger because the file system only can assign disk space in allocation blocks, regardless of what portion of the allocation block is actually used.
- Files: The number of files contained in the folder.
- Subfolders: The number of folders contained in the folder.
- Created: The date the folder was created.
- Modified: The date the folder or any files in the folder were last modified.
- Comments: Lets you view and modify any existing comments or insert new folder comments. Folder comments are displayed in the Finder Get Info dialog box.

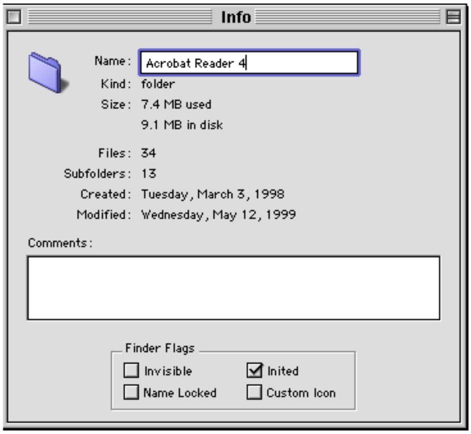
Finder flags

- Invisible: If this checkbox is selected, the folder is not visible in the Finder. This means the folder does not appear on the desktop or in most Standard File dialog boxes.

- Inited: If this box is unchecked, the Finder will “Clean Up” the icon’s position in its folder. In order for the change to take place, the folder has to be closed and reopened. After finding a location for the icon, the Inited box will be automatically reselected.
- Name Locked: If this checkbox is selected, the folder cannot be renamed from the Finder, and it cannot have customized icons assigned to it.
- Custom Icon: If this checkbox is selected, the folder has a customized icon.

Applications and files

Norton Disk Doctor’s Get Info dialog box displays assorted information about your applications and files. Files and applications store much of the same information, but applications also contain information about the application’s memory requirements.



Name: Acrobat Reader 4
Kind: folder
Size: 7.4 MB used
9.1 MB in disk
Files: 34
Subfolders: 13
Created: Tuesday, March 3, 1998
Modified: Wednesday, May 12, 1999
Comments:

Finder Flags
☐ Invisible ☑ Inited
☐ Name Locked ☐ Custom Icon

General information

- Name: The name of the application or file you selected is displayed.
- Locked: If checked, the application or file cannot be thrown away or modified.
- Kind: For applications, the kind is “application.” For documents, the kind is either the name of the application that owns that document, or just “document” if the application is unknown.
- Size: The size of the application’s or file’s resource and data forks. As with folders, shows the actual size of the file, and the amount of space it takes on the disk.

- Created: The date the application or file was created.
- Modified: The date the application or file was last modified.
- Version: The version number and copyright information of the application or document. This information is provided by the programmer.
- Comments: Lets you view and modify any existing file comments or insert new file comments. File comments are displayed in the Finder Get Info dialog box.

Finder flags

- On Desk: If this checkbox is selected, it means the application or file is on the desktop.
- Invisible: If this checkbox is selected, the application or file is not visible in the Finder. This means the application or file does not appear on the desktop or in most Navigation Services dialog boxes that appear when you open or save a file.
- Bundle: If this is checked, icons are stored in the resource fork of the application or file.
- Stationery: If this checkbox is selected, the file is a stationery pad. This means that when you open the file, its contents are copied and opened in an untitled window.
- Shared: If this checkbox is selected, the application is available to be shared by multiple users over a network.
- Inited: If this checkbox is selected, the Finder has seen the file or application and assigned it to a location on the desktop.
- Alias: If this checkbox is selected, the file is an alias.
- No INITs: If this checkbox is selected, the file's initialization procedure will not be loaded at startup. This item only affects startup files such as INITs and System Extensions.
- Name Locked: If this checkbox is selected, the application or file cannot be renamed from the Finder, and it cannot have customized icons assigned to it.
- Custom Icon: If this checkbox is selected, the application or file has a customized icon.

Type and Creator

- Type: Displays the type of the application or file. Type distinguishes between applications and documents, and different types of documents. Type can be changed by entering a new type of code in the text box. Applications always have the type APPL. If you cannot open a word processing document, changing this type to TEXT may allow it to be opened by any application that can read text documents.

Warning: Be careful when modifying type and creator codes. Setting the wrong code may cause a document not to be recognized by the application that created it.

- Creator: Displays the creator of the application or file. The creator distinguishes one application's documents from another application's documents. The creator can be changed by typing in a new creator code in the text box.

Application memory (applications only)

Applications store the same information as files, and also contain information about the application's memory requirements.

- Suggested: The amount of memory (RAM) the application normally uses to run in. This is determined by the programmer.
- Minimum: The minimum amount of memory (RAM) in which the application can run. This is determined by the programmer.
- Current: The current amount of memory (RAM) assigned to the application. To change this amount, select the number, press the delete key, and enter a new number.
- 68K: Whether this is a 680x0 application.
- CFM-68K: Whether the application is designed to use the code fragment manager (CFM).
- Power PC: Whether this is a Power PC application.

Rebuilding the Desktop

Desktop files are invisible files that help keep track of the files on each volume. As you work with a volume, information is added to these files. If they are damaged, they can cause startup problems. Rebuild the Desktop once a month.

Norton Disk Doctor lets you use the Finder's ability to rebuild Desktop files for selected disks.

To rebuild the Desktop:

1 Start Norton Disk Doctor.

2 On the Tools menu, click Rebuild Desktop.

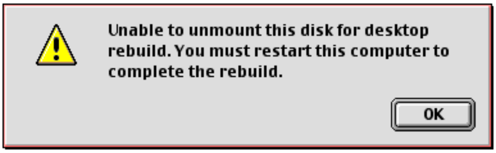
When you rebuild the Desktop, any comments you have added to the files' Get Info windows are lost, since the Desktop file containing these comments is deleted.

3 If asked to confirm, click OK.

4 If you don't want to see this alert the next time you rebuild the desktop, click Don't show this alert again.

The Desktop files of the selected volumes are made visible and moved to the Trash, and the disks are unmounted.

If any disks cannot be unmounted, you are notified.



Unable to unmount this disk for desktop rebuild. You must restart this computer to complete the rebuild.

5 Click Restart.

The Desktop files are rebuilt by the Finder during startup.

If you click Continue, the unmountable volumes are remounted, and the Finder rebuilds the desktop files for those volumes.

On disks with open files, the Desktop files will be rebuilt the next time the computer is restarted.

Setting preferences

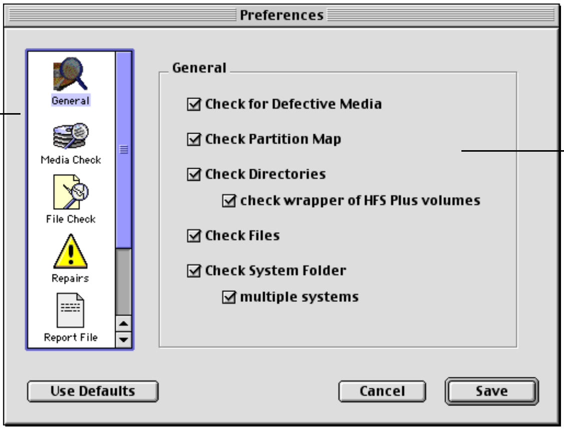
Although the default settings are appropriate for most testing, you can configure Norton Disk Doctor to reflect your work needs or special test situations. For example, if you want Norton Disk Doctor only to diagnose a disk, you can turn off the repair options in the Repair Preferences panel.

Note: A complete description of all Preferences settings is available in the Norton Disk Doctor Guide and in the Balloon Help.

To change the default settings:

1. Choose Preferences from the Edit menu.

   The Preferences dialog box appears.



General

☑ Check for Defective Media

☑ Check Partition Map

☑ Check Directories

  ☑ check wrapper of HFS Plus volumes

☑ Check Files

☑ Check System Folder

  ☑ multiple systems

Select a Preference category in the scrolling list

Turn on balloons to see descriptions of all settings

2. Select the Preferences category you want to change in the scrolling list.

   The selected category's preferences appear.

3. To view a setting's description, turn on Balloon Help and point to a setting. Do one of the following to use Balloon Help or Apple Guide help:

   - To display balloons, choose Show Balloons from the Help menu.
   - To display the Norton Disk Doctor Guide, choose Norton Disk Doctor Help from the Help menu.

4. If you make changes, click Save.

   - Click Cancel to close Norton Disk Doctor Preferences without making changes.
   - To return to the original Norton Disk Doctor settings, click Use Defaults.

   The changes take effect immediately, and you return to the Norton Disk Doctor main window.

C H A P T E R 3

UnErase

When you throw away a file and empty the trash, only the disk's directory is actually modified. Although the filenames no longer appear, the data from erased files remains on the disk until the space is needed to store other files. UnErase can use several methods to locate this data and let you recover those erased files. This chapter explains how to use UnErase to:

- Recover thrown-away or erased files. For more information, see "Recovering erased or missing data" on page 76.
- Filter the display of erased files located by UnErase. For more information, see "Filtering the erased files list" on page 81.
- Search for lost files by text or file type, and create templates for specialized searches. For more information, see "Performing customized searches" on page 84.
- Recover erased files to floppy disks, even if a file is too large to fit on a single floppy disk, and reconnect files. For more information, see "Rejoining file segments" on page 93.
- Recover data from an irreparably damaged disk. For more information, see "Locating missing disks" on page 92.

Caution: If you purchased Norton Utilities for Macintosh to recover erased files, do not install to the disk containing the erased file, or to a startup disk containing erased files. You could overwrite part of a file you're trying to recover. For information on how to proceed, see "Before you begin" on page 11.

UnErase can also recover data from an irreparably damaged disk after Volume Recover or Norton Disk Doctor tells you this is the only course of action. For example, you can recover files that disappear from folders because a disk's directory information has become corrupted. UnErase includes advanced capabilities to access a disk whose structure is so damaged that it does not even appear on your desktop.

Recovering erased or missing data

UnErase can use several different techniques to search for erased files or missing data. When you click Quick Search on the UnErase main window, UnErase uses the method most likely to succeed. UnErase will scan your disk's directory and, if you have FileSaver protection enabled, a FileSaver search is used.

If the first search method is unsuccessful, use the Customized Search and choose a more specialized method. For more information on customized searches, see "Performing customized searches" on page 84.

Using FileSaver protection to assist UnErase

It is best to always use FileSaver, which maintains a special hidden file to keep track of the pieces of erased files. This information is updated automatically whenever a file is thrown away to maximize chances of data recovery. For information on configuring FileSaver protection, see "Norton FileSaver" on page 131.

While FileSaver keeps track of the location of erased files, it does not actually store the files. If your disk is full, it is likely that data from erased files will be overwritten. So, it is important to use UnErase as soon as possible after the files are deleted.

Recovering erased files

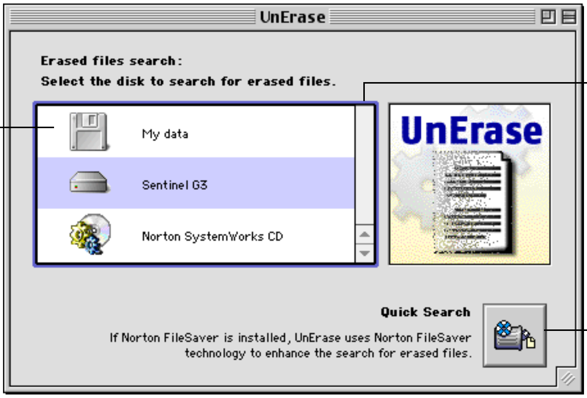
Although UnErase has powerful data-recovery capabilities, basic operation is simple and almost completely automatic.

Note: If you cannot find a file, but you do not think it was erased, try using Fast Find before using UnErase. For more information, see "Fast Find" on page 149.

To recover erased files:

1 In the Norton Utilities main window, click UnErase.

The UnErase window appears.



Erased files search:
Select the disk to search for erased files.

If Norton FileSaver is installed, UnErase uses Norton FileSaver technology to enhance the search for erased files.

Select a disk

Scroll to view all available volumes

Click to search for erased files

2 Select the disk that you think contains the erased file.

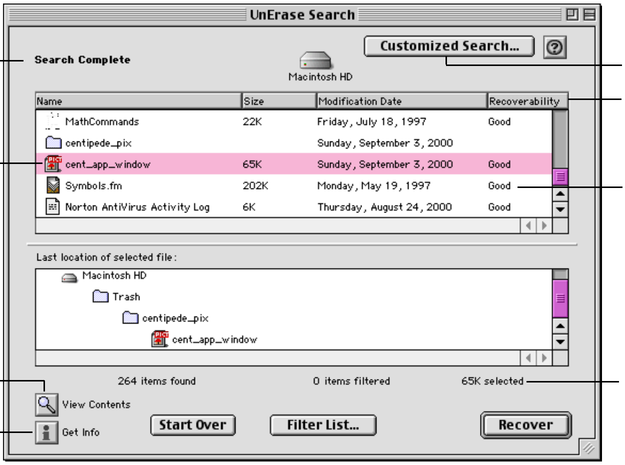
Scroll to see available volumes.

Note: If the volume containing the missing file or data doesn't appear in this list, see "Locating missing disks" on page 92.

---

3 Click Quick Search.

UnErase searches the selected disk for erased files and displays the results in the UnErase Search window, with an estimate of the file's successful recovery.



Search Complete

Name	Size	Modification Date	Recoverability
MathCommands	22K	Friday, July 18, 1997	Good
centipede_pix		Sunday, September 3, 2000	
cent_app_window	65K	Sunday, September 3, 2000	Good
Symbols.fm	202K	Monday, May 19, 1997	Good
Norton AntiVirus Activity Log	6K	Thursday, August 24, 2000	Good

Last location of selected file:
Macintosh HD
  Trash
    centipede_pix
      cent_app_window

264 items found 0 items filtered 65K selected

Indicates the search for erased files is complete

Select one or more files

View the contents of the selected file

Get information about the selected file

Click to use other search techniques

Click a column title to sort list

Estimate of file recoverability

Size of selected files

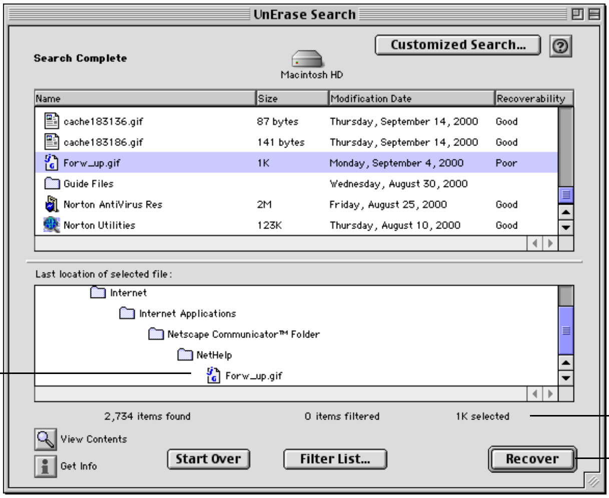
4 To sort the UnErase Search window listing, click the Name, Size, Modification or Deletion Date, or Recoverability column title.

5 To view more information or the contents of an erased file, select the file and click Get Info or View Contents. For more information, see “Viewing an erased file’s information” on page 80.

6 Select one or more files to recover.

- Shift-click to select several adjacent files. Command-click to select non-adjacent files.
- To eliminate unrecoverable files from the erased file list, choose Hide Unrecoverable Files from the Tools menu.

A selected file’s last location appears in the lower part of the UnErase Search window.



Search Complete

Name	Size	Modification Date	Recoverability
cache183136.gif	87 bytes	Thursday, September 14, 2000	Good
cache183186.gif	141 bytes	Thursday, September 14, 2000	Good
Forw_up.gif	1K	Monday, September 4, 2000	Poor
Guide Files		Wednesday, August 30, 2000	
Norton AntiVirus Res	2M	Friday, August 25, 2000	Good
Norton Utilities	123K	Thursday, August 10, 2000	Good

Last location of selected file:

- Internet
  - Internet Applications
    - Netscape Communicator™ Folder
      - NetHelp
        - Forw_up.gif

2,734 items found 0 items filtered 1K selected

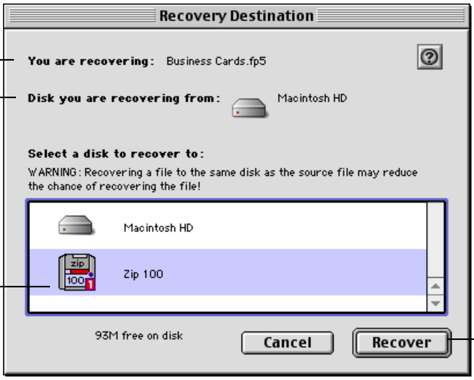
Location of selected file before it was erased

Summary of files found and filtered

Click to recover selected files

7 Click Recover.

The Recovery Destination dialog box appears with a confirmation of the files to be recovered and the disk from which you are recovering.



Recovery Destination

You are recovering: Business Cards.fp5

Disk you are recovering from: Macintosh HD

Select a disk to recover to:

WARNING: Recovering a file to the same disk as the source file may reduce the chance of recovering the file!

Macintosh HD

Zip 100

93M free on disk

Names or number of files being recovered

Name of volume you are recovering from

Select a location for the recovered files

Click Recover to confirm and complete the recovery

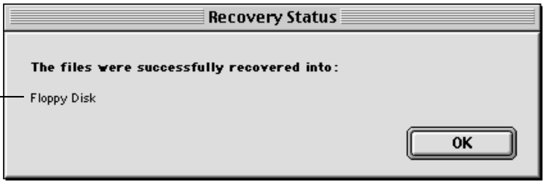
8 Select a disk on which to save the recovered files.

Caution: It's best to choose a different hard disk, floppy disk, or other volume to save recovered files. When you recover a file to the same disk, you may overwrite the file you are currently recovering, or other erased files that you may still want to recover.

---

9 Click Recover.

UnErase recovers the files and displays a status message.



Recovery Status

The files were successfully recovered into:

Floppy Disk

Name of recovery destination

When UnErase recovers a file, it creates a folder with the same name and hierarchy as the folder in which the file last resided. This folder is placed within a folder called "Recovered Files."

Note: If you are recovering a file to a floppy disk and the file is larger than a single disk, be sure you have enough floppy disks to hold the recovered files. UnErase automatically splits large files across as many disks as necessary. You can use UnErase to rejoin the files later. For information on reuniting split files, see "Rejoining file segments" on page 93.

10 To recover more files from the UnErase Search window, repeat steps 6 through 9.

Tip: Unfragmented files have a greater chance for recovery. Use Speed Disk on a regular basis to reduce file fragmentation. See "Speed Disk" on page 103 for more information.

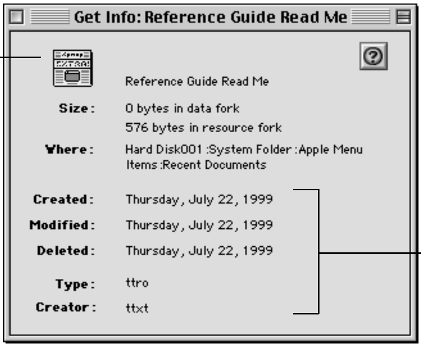
Viewing an erased file's information

When you have the UnErase Search window open, you can select an erased file and view more information about it, or view its contents.

To get information about an erased file:

1. In the UnErase Search window, select one or more files.
2. Click Get Info.

   The Get Info window appears.



Get Info: Reference Guide Read Me

Reference Guide Read Me

Size: 0 bytes in data fork
576 bytes in resource fork

Where: Hard Disk001 :System Folder :Apple Menu Items :Recent Documents

Created: Thursday, July 22, 1999

Modified: Thursday, July 22, 1999

Deleted: Thursday, July 22, 1999

Type: ttro

Creator: ttxt

Icon, filename, and other file statistics

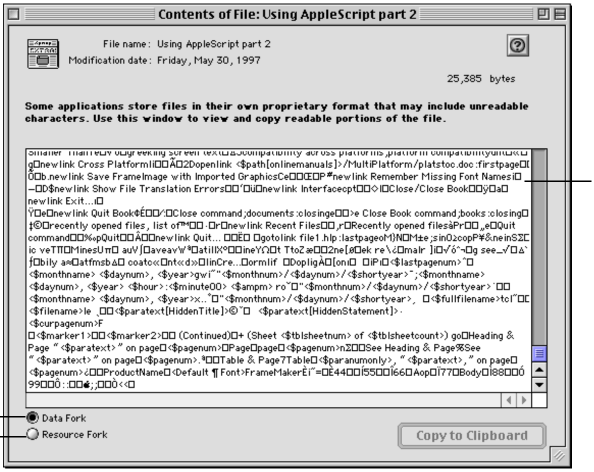
Creation, modification, and deletion dates and Type and Creator codes are displayed if known

The Get Info window displays the erased file's name, dates of creation and modification, and Type and Creator code, if available.

To view the contents of an erased file:

1. In the UnErase window, select one or more files.
2. Click View Contents.

The contents of the first selected file appear.



File name: Using AppleScript part 2
Modification date: Friday, May 30, 1997
25,385 bytes

Some applications store files in their own proprietary format that may include unreadable characters. Use this window to view and copy readable portions of the file.

Select, cut, and paste contents of a file from this window

Click to view different contents

If the file has both a data fork and a resource fork, you can view the contents of either.

3 Click the Data Fork or Resource Fork button to view the file's data or resource fork contents.

Note: If you view the contents of a file that is not a plain text file, you will see information that looks like gibberish. This is normal computer code and does not mean that your file is damaged or unrecoverable. Look for fragments of text to help you determine whether the selected document is the one you're looking for.

---

4 To copy contents to the Clipboard, drag across the text and click Copy to Clipboard.

Note: If the file is very large, you may not have enough memory to view all of its contents.

Filtering the erased files list

When UnErase searches for erased files, it may display many files and folders that you don't want to see. You can hide files you don't want to see by filtering them out of the UnErase Search window using the Filter List feature. For example, if you often use a specific type of graphic or document, you can define a filter that displays only those graphic or document file formats, and hides other types of erased files that you don't want to see.

You can create a filter based on one sample file. Once you create and save a filter in the File Type Templates folder, you can use it whenever you want.

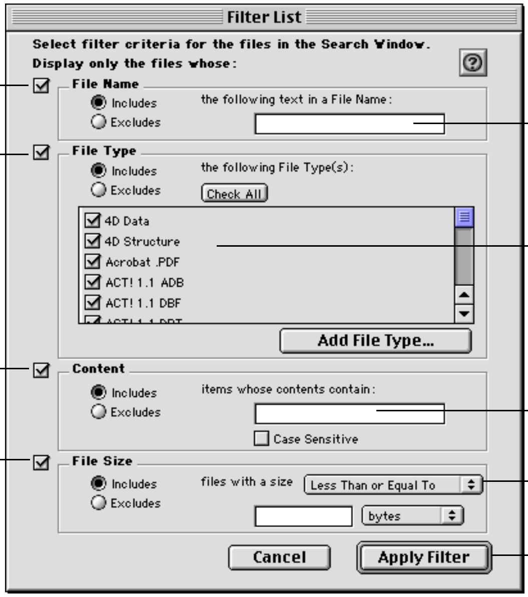
Unlike File Type templates, which require a suggested ten sample files to be fully effective, filters are based on a single sample file.

Tip: To eliminate unrecoverable files from the erased file list before using a Quick Search, choose Hide Unrecoverable Files from the Tools menu.

To filter the list of erased files:

1 From the UnErase Search window, click Filter List.

The Filter List dialog box appears.



Filter List

Select filter criteria for the files in the Search Window.
Display only the files whose:

☑ File Name
● Includes
○ Excludes
the following text in a File Name:

☑ File Type
● Includes
○ Excludes
the following File Type(s):
Check All
☑ 4D Data
☑ 4D Structure
☑ Acrobat .PDF
☑ ACT! 1.1 ADB
☑ ACT! 1.1 DBF
Add File Type...

☑ Content
● Includes
○ Excludes
items whose contents contain:
☐ Case Sensitive

☑ File Size
● Includes
○ Excludes
files with a size Less Than or Equal To
bytes

Cancel
Apply Filter

Select a checkbox to activate its settings

Enter partial text to search for a file name

Select an existing File Type or create a new File Type Template

Enter text contained within the file to search for

Specify the size of file to search for

Click to apply your search criteria to the UnErase Search window

2 You can set the following options in the Filter List:

File Name Displays only the files whose names match the criteria you specify. Select the File Name checkbox, then enter the filename text. Select Include or Exclude to indicate whether to include or exclude the text from your display.

File Type	Displays only the file types you specify. Select the File Type checkbox, then select a file type from the list. Select whether to include or exclude these types of files from your display. You can also specify a different File Type by clicking the Add File Type button. For more information on adding File Type templates, see "Creating File Type templates" on page 87.
Content	Displays only those files whose contents match the criteria you specify. Select the Content checkbox, then enter the text you want to use as criteria. Select whether to include or exclude this text from your display.
File Size	Displays files whose size matches the criteria you specify. Select the File Size checkbox, select Less Than Or Equal To or Greater Than Or Equal To from the list, enter a value in the text box, and choose a measurement of bytes, K (kilobytes), or MB (megabytes).

3 Click Apply Filter.

The filter is applied to the list of files in the current UnErase Search window. The total number of files found and filtered appears in the bottom of the window.

Changing or removing a filter

A filter is active until you change it, remove it, or quit UnErase.

To remove a filter:

1 From the UnErase Search window, click Remove Filter.

The filter is removed from the list.

To change a filter:

1 From the UnErase Search window, click Filter List.

The Filter List dialog box appears.

2 Deselect any selected checkboxes.

3 Click Apply Filter.

The previously applied filter is removed.

The total number of files found and filtered appears at the bottom of the UnErase Search window.

Performing customized searches

If a quick search does not give you the desired results, you can customize a search to look for erased files or lost data. A customized search may find erased files not found through a quick search.

A customized search is also the best way to recover files from a disk with irreparable directory damage. Use a customized search when Norton Disk Doctor and Volume Recover can't restore your disk.

There are several search methods to choose from. If you do not find a file with the first method used, you can try another, or you can use multiple methods simultaneously.

Performing Catalog, File Type, and Text searches

Use UnErase's available customized searches to suit your requirements. For example, if FileSaver information is not current, you may have success with a File Type Search. If you cannot locate a file with a Catalog Search, but you remember the application used to create it, try a File Type Search. Use a Text Search to search for specific text within a file.

If the directories are damaged and you are trying to recover files that were not "erased" but can't be located due to damage, then the Catalog Search for Real and Erased files is the best thing to try. In this case you should also try using the Restore Directories feature in Volume Recover.

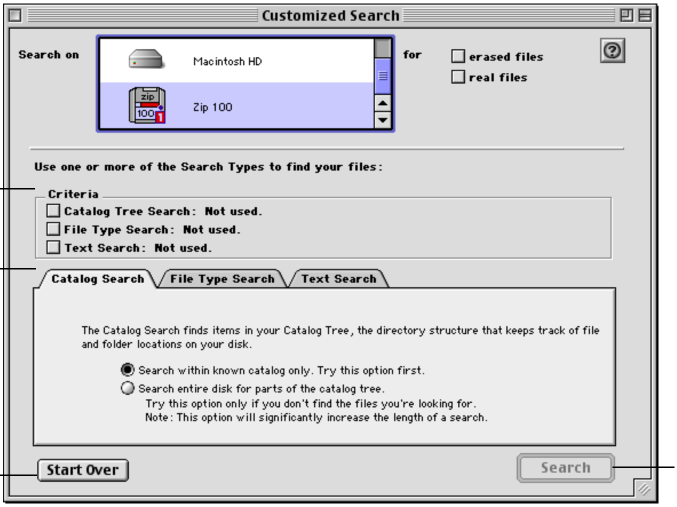
UnErase data search methods can be used on damaged disks. You can try to recover data from disks that Norton Disk Doctor or Volume Recover report are damaged beyond repair. For more information, see "Locating missing disks" on page 92.

To specify a Customized Search type:

1 If you have already performed a Quick Search, click the Customized Search button at the top of the window.

  Otherwise, from the UnErase main window you can choose Customized Search from the Tools menu, or press Command-B. When the UnErase Search window appears, click Customized Search.

By default, the volume selected in the main window or Quick Search is selected in the Customized Search window.



Use one or more of the Search Types to find your files:

Criteria
☐ Catalog Tree Search: Not used.
☐ File Type Search: Not used.
☐ Text Search: Not used.

The Catalog Search finds items in your Catalog Tree, the directory structure that keeps track of file and folder locations on your disk.

● Search within known catalog only. Try this option first.
○ Search entire disk for parts of the catalog tree.
Try this option only if you don't find the files you're looking for.
Note: This option will significantly increase the length of a search.

Select a checkbox to specify search criteria.
The related tab moves to the front

Restart the UnErase search

Search with customized settings

2 Select the disk to search on.

3 Select options to tell UnErase where to search.

- Erased Files

  UnErase looks for files in the unused, erased files area of your disk. If your disk is healthy, select this option.

- Real Files

  UnErase searches the currently used parts of your hard disk directory for files that do not appear to have been intentionally deleted. When performing a File Type or Text search, UnErase searches the used parts of a disk, where files are expected to exist. If your disk directory information has been damaged, you will obtain the best results by selecting both the Real Files and Erased Files checkboxes.

Tip: If files or folders seem to have disappeared for no reason, run Norton Disk Doctor before searching with UnErase. Norton Disk Doctor may be able to reconstruct a damaged directory. For information on disk diagnosis and repair, see "Viewing and changing file, folder, or disk information" on page 64.

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4 Select one or more of the following search methods:

- Catalog Search

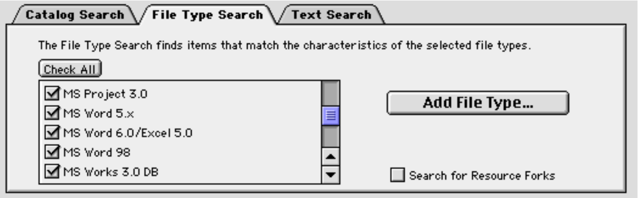
  Searches the disk directory for valid file records. If you are looking for Erased Files only, and your hard disk is functioning normally, do not select Search Entire Disk For Parts Of The Catalog Tree.

  If your hard drive has crashed, or a large number of files have unexpectedly disappeared, try the Catalog Search for Real Files and Erased Files, first with Search Entire Disk deselected. If large numbers of files are still missing, search again with this checkbox selected.

Note: Selecting this option will slow down the search significantly.

- File Type Search

  Searches the disk for files that match the selected file types.



The File Type Search finds items that match the characteristics of the selected file types.

☑ MS Project 3.0
☑ MS Word 5.x
☑ MS Word 6.0/Excel 5.0
☑ MS Word 98
☑ MS Works 3.0 DB

☐ Search for Resource Forks

a If an application's file type doesn't show up on the list, you can click Create File Type to specify an application, and create a template to use for searching.

A File Type Search is most useful when a Quick Search has not found the erased files you need, or when the Catalog Search is unsuccessful. When using this search method, you can search for files created by specific applications.

b Because directory information is not referenced in a File Type Search, the UnErase window will list generic filenames (such as Photoshop 2/3/4/5 #1, and so on). Rename the files after you recover them, or join the file forks with the Join Forks command. For more information, see "Recovering data and resource forks" on page 90.

c Select Search For Resource Forks to have UnErase search for all resource forks on the drive, in addition to the selected file types. When this box is not selected, UnErase finds only the resource forks belonging to the selected File Types.

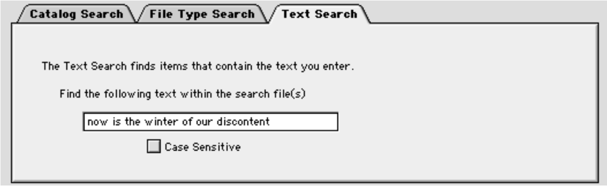
Searching for Resource Forks is particularly useful for recovering fonts, as well as many types of Preferences files that can’t be found as specific file types.

- Text Search

  Lets you search for words or phrases that you know were in a file.

  Use a Text Search when salvaging word processing documents or other text-based data files, or when you cannot remember the name of an erased text file.

  Text Searches are useful for finding saved email files. Try searching for your own email address to find mail that you have sent or received.



The Text Search finds items that contain the text you enter.

Find the following text within the search file(s)

now is the winter of our discontent

☐ Case Sensitive

a Enter a word or phrase from the file in the Search Text box.

UnErase finds all files that contain the search text.

b Select Case Sensitive to further restrict the search. For example, “Mark” is not a match for “mark” when Case Sensitive is selected.

Directory information is not referenced in a Text Search so the UnErase window lists generic filenames (such as Text File #1, and so on). Rename the files after you recover them, and verify that the recovered information is correct.

Note: Make sure you have specified the maximum file size for text and file type searches in UnErase Preferences. By default, the File Type search maximum size is set to 40000K, and Text Search maximum size is 32K. If you find that the files being found are too large or too small, adjust this size.

Creating File Type templates

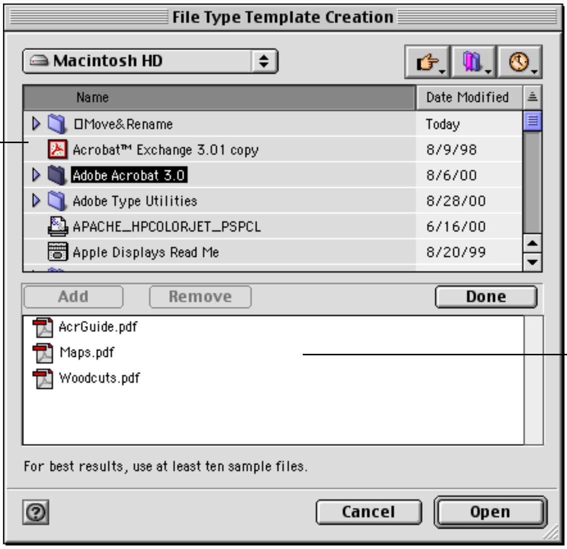
UnErase lets you create a File Type template that can identify files created by a particular application. This template is created from a selection of data files created by the application. Once a File Type template is created, you can reuse it to search for erased files.

While filters are based on a single sample file, File Type templates require a larger selection of files to provide variations within the file type. Both filters and File Type templates are saved in the File Type template folder, and can be used repeatedly.

To create a File Type template:

1 With the UnErase window open, choose Create File Type Template from the Tools menu.

A dialog box appears where you can select files for UnErase to create a File Type template.



Name	Date Modified
◻Move&Rename	Today
Acrobat™ Exchange 3.01 copy	8/9/98
Adobe Acrobat 3.0	8/6/00
Adobe Type Utilities	8/28/00
APACHE_HPCOLORJET_PSPCL	6/16/00
Apple Displays Read Me	8/20/99

AcrGuide.pdf
Maps.pdf
Woodcuts.pdf

For best results, use at least ten sample files.

Locate examples of a file type

Add files of the same type to create a File Type template

The files selected should be of exactly the same type as the file type you want to recover.

For example, if an application can create word processing or spreadsheet documents, you may wish to create a template for these types of files. Do not mix together both types of files when creating the template. Use only word processing documents in one template and spreadsheets in another.

2 In the top part of the window, locate and select a file of the desired type, and then click Add.

Added files are listed in the lower window.

3 Continue adding files of the same type. For best results, you should add at least ten sample files of the same type to create a template.

4 Click Create.

A dialog box appears where you can enter a location and name for the File Type template. Use a name that will help you remember the file type. For example, if you are creating a ClarisWorks word processing file type, you might call the template "Claris WP."

5 Enter a name and click Save. It is best to save the new template to the File Type templates folder in the Norton Tools folder. This is the default location.

The File Type template is saved for the next UnErase search.

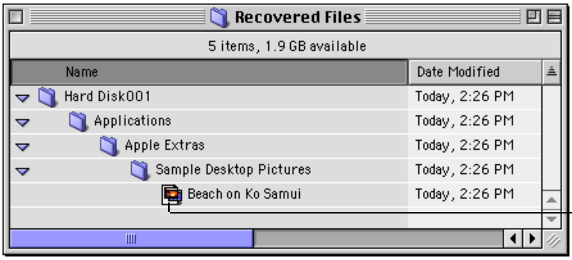
Using custom File Type templates when booted from the Norton Utilities CD

In order for UnErase to use a new template you create, it must be located in a folder that also contains all of the default File Type Templates that are shipped with Norton Utilities. Without these other File Type Templates, UnErase can't locate the ends of recovered files.

If you wish to be able to use a new File Type Template when you restart from the Norton Utilities CD, or at a time when you are not able to access your hard drive, copy the File Type Templates folder from the Norton Utilities CD to another disk, such as a floppy, a Zip disk, or another hard drive. Add your custom template to this copied folder. When you start UnErase from the Norton Utilities CD, choose Preferences from the Edit menu and specify this copied folder as the desired location for the File Type Templates folder. This ensures that UnErase will use your custom File Type Template.

Recovering files from the Trash

When UnErase recovers a file using a Quick Search or Catalog search, it creates a folder with the same hierarchy and name as the last folder in which the file resided, as in the following example:



Recovered Files

5 items, 1.9 GB available

Name	Date Modified
Hard Disk001	Today, 2:26 PM
Applications	Today, 2:26 PM
Apple Extras	Today, 2:26 PM
Sample Desktop Pictures	Today, 2:26 PM
Beach on Ko Samui	Today, 2:26 PM

UnErase recreates the recovered file's original hierarchy inside a "Recovered Files" folder

If you have previously dragged a file to the Trash and then emptied the Trash, UnErase attempts to determine the folder from which the file was originally taken. However, if necessary, UnErase will create a Trash folder inside the Recovered Files folder. Do not confuse this folder with the original Trash.

Recovering data and resource forks

When you recover a file using a File Type search, you may have to perform some additional work to recover the entire file. Some Macintosh files have two parts:

- **Data Fork:** The part of a file that contains text, graphics, or other modifiable information.
- **Resource Fork:** The part of a file that contains information used by an application, such as menus, fonts, icons, or executable code.

The majority of document files have only a data fork, although some have both a data fork and a resource fork. UnErase lists each fork as a separate file in a File Type search.

Joining resource and data forks

Because directory information is not referenced in a File Type Search, a data fork is listed with a generic name identifying the document type, for example, Photoshop 2/3/4/5 #1.data. A resource fork is listed with the original file name of the document, and the suffix, .rsrc, for example, Artwork.rsrc. In most cases, the data fork is the one that contains the essential file data you want to recover.

When you recover an erased file with a resource fork and a data fork, you may have to rejoin the two parts to restore the file to its original condition. The resource fork can also be a great help in determining the original name of the file.

Because the data and resource forks of a file are often physically adjacent on the hard drive, you can often identify a data fork by the name of the resource fork next to it. For example, if you find a file called Photoshop 3/4/5 #25.data, and next to it is a resource fork with a Photoshop icon and the name Cover Photo.rsrc, it is likely that these two forks belong to the same file. At that point, you can join the forks using the Join Forks command.

- If you have sorted the list of files, you will need to restore the order in which the files were originally found before you can see which forks lie next to each other. To do this, Option-click any unselected column heading. This removes any sorting from the list.
- If you can't find a resource fork to help you name a file, you can rename a data fork once you have established the contents of the file. Once you have recovered the file, open it and use the Show Contents command to help identify it.

To join a single resource and data fork:

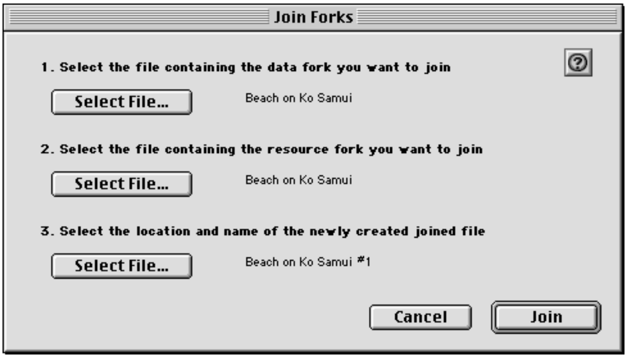
1. With the list of found files open, select a single resource fork and a single data fork. Use the Command key to select non-adjacent files.
2. When you have selected exactly one of each fork type, choose Join Forks from the Tools menu. The original name of the file is filled in for you; if you wish, you can enter a different filename.
3. Click Save to recover the file.

If you have already recovered the files to be joined, follow the next procedure.

To join resource and data forks of files already recovered:

1. With the UnErase main window open, choose Join Forks from the Tools menu.

   The Join Forks dialog box appears.



Join Forks

1. Select the file containing the data fork you want to join

Beach on Ko Samui

2. Select the file containing the resource fork you want to join

Beach on Ko Samui

3. Select the location and name of the newly created joined file

Beach on Ko Samui #1

2. Do the following in the Join Forks dialog box:
   - **a** Click the first Select File button, locate and select the data fork in the appropriate Recovered Files folder, and click Open.

     The file name appears next to the first Select File button.

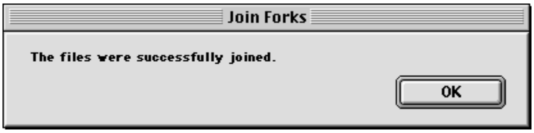
- **b** Click the second Select File button, locate and select the resource fork in the appropriate Recovered Files folder, and click Open.

  The file name appears next to the second Select File button.
- **c** Click the third Select File button and, in the dialog box that appears, select a location for the joined file, enter a name for the joined file, and click Save.

  When you have identified the data fork, resource fork, and have entered a filename, the Join button becomes available.

3 Click Join Forks.

UnErase displays the status of the joined file.



Join Forks

The files were successfully joined.

You should now be able to open the file using the application that created it.

Locating missing disks

When a disk has damaged file system information, it will not be recognized as a disk. When a disk is not listed in the Norton Disk Doctor, Unerase, or Volume Recover windows, you can try to locate it in the following ways:

- Search for data structures characteristic of a disk.
- Locate devices by their ID numbers or other information.
- Use the Add Missing Disks feature.

If these techniques fail, you can manually enter specific data regarding the disk you want to recover.

To try to locate a missing disk:

1 Choose Show Missing Disks from the Disks menu.

All active connected devices are rescanned to find available drives.

If a disk is found, it appears in the list of devices.

2 If you want to recover lost data from a located disk, use the procedure “Performing customized searches” on page 84. Since this disk’s directory structures may be damaged, you should search for both Real and Erased files.

Adding missing disks

Because missing USB and FireWire devices may not be accessible using the Show Missing Disks procedure, use the Add Custom Disks command.

To add a missing disk:

1. Click Add Custom Disks.
2. In the device list, open the triangle and click the device you want to add.
3. Click Add.

For more information on locating and recovering missing disks, see "Selecting missing disks" on page 61.

Rejoining file segments

If UnErase recovers an erased file to a floppy disk, and the file is too large to fit on a single floppy disk, UnErase divides the file into floppy disk-sized segments. You can rejoin these segments using the following procedure.

To rejoin file segments:

1. Make sure you have the component files available and enough disk space for the restored files.
2. Insert the floppy disk with the first segment of the recovered file.

   The first segment is named "<filename>#1" with subsequent segments numbered consecutively.
3. Choose Join Split Recovered Files from the Tools menu.
4. Select the file to be recovered and click Rejoin.
5. Enter a name and destination for the recovered file, and click Save.

   UnErase completes the process, prompting you to insert the disks with the file segments as necessary. Make sure to insert the disks in the correct order.

Setting UnErase preferences

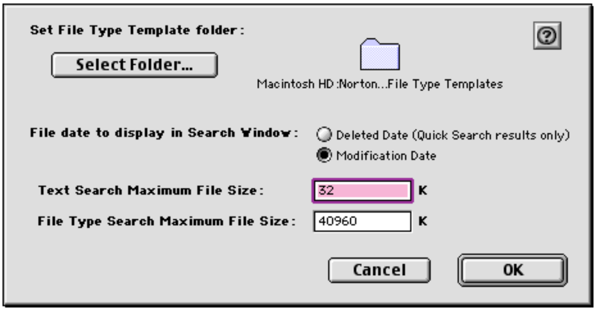
You can specify the location of the File Type templates folder, the maximum allowed file size to recover using a Text or File Type Search, and the type of date to display in the UnErase Search window.

To set UnErase preferences:

1 Start UnErase.

2 Choose Preferences from the Edit menu.

The Preferences dialog box appears.



Set File Type Template folder:

Macintosh HD :Norton...File Type Templates

File date to display in Search Window:
○ Deleted Date (Quick Search results only)
● Modification Date

Text Search Maximum File Size: 32 K

File Type Search Maximum File Size: 40960 K

3 Set the following preferences:

- Set File Type Template Folder

  Specify the folder containing the File Type templates used to find files and filter the list of files in the UnErase Search window. When you have selected a File Type templates folder, its path appears in the dialog box. The default location for the installed File Type Templates folder is in the Norton Tools folder.

- File Date To Display In Search Window

  Select the date to display in the UnErase search list of files. You can select the erased file's deletion date, or date the file was last modified. Modification dates can be displayed only for files found using the QuickSearch or Catalog Tree search methods, and deletion dates can be displayed only for QuickSearch files recovered using FileSaver data.

- Text Search Maximum File Size

  Enter the maximum size in kilobytes of the largest file you want to recover using a Text search. The default is 32K, the maximum size text file that can be opened by SimpleText.

- File Type Search Maximum File Size

  Enter the maximum size in kilobytes of the largest file you want to recover using a File Type search. The default size is 40000K.

CHAPTER

4

Volume Recover

If your hard disk has been damaged, reinitialized or erased accidentally, you can use Volume Recover to locate FileSaver information and use it to restore a disk's directory structure. See "Recovering data from damaged volumes" below.

Sometimes missing files are not listed in a disk's directory because damage to the directory prevents the corresponding directory entries from being found. If your directory is damaged, you can use the Rebuild Directories feature. See "Rebuilding directories" on page 100.

Note: It's good practice to keep all your disks protected by FileSaver at all times. If Volume Recover is not successful in restoring your disk by rebuilding the directory or recovering FileSaver information, try using UnErase to recover files from the disk. For more information, see "Recovering erased or missing data" on page 76.

Recovering data from damaged volumes

In most cases, you need to use Volume Recover only on the advice of Norton Disk Doctor to recover directory structures or partition information. If you have accidentally initialized a hard disk or changed your partition structure using driver software, you can use Volume Recover directly. Volume Recover is also useful if you have accidentally thrown away so many files that FileSaver does not track them all, for example, if you accidentally delete an important folder.

If you want to recover a very large folder that you have thrown away, using Volume Recover to recover FileSaver information provides your best chance of recovery.

Note: Volume Recover cannot recover an initialized floppy disk or a hard disk that has been low-level formatted, as these procedures completely erase all information on the disk.

Using Volume Recover with FileSaver files

The FileSaver information contains a description of your physical disk and how information is stored on it that allows the disk to be accessed.

Note: Volume Information Files (VIF) created with a previous version of Norton Utilities for Macintosh, are only used with Norton Utilities for Macintosh versions 3.5.x and lower. They are not used by Volume Recover. Make sure you have activated the latest version of Norton FileSaver so you have current data on all your disks. For more information on Norton FileSaver, see "Protecting disks with Norton FileSaver scans" on page 132.

FileSaver maintains two disk files in case incorrect information is saved to one file. Each time you restart your Macintosh, (depending on your FileSaver Preference settings) FileSaver activates the file that was inactive during your previous session and updates only the active file during the current session. If disk damage occurs during the session, that information is saved to the active FileSaver file, but you still have the file from your previous session. If you leave your Macintosh on all the time, FileSaver will switch the active file every 24 hours. For more information on protecting your disks with FileSaver, see "Norton FileSaver" on page 131.

Note: Volume Recover will not recover your Startup Disk, the disk containing the Volume recover application, or locked disks. If you select one of these disks, the Recover button is disabled. To use Volume Recover in these circumstances, start your Macintosh using the Norton Utilities for Macintosh CD, start Norton Utilities, and choose Volume Recover from the Utilities menu. For more information, see "Running Norton Utilities from the CD" on page 12.

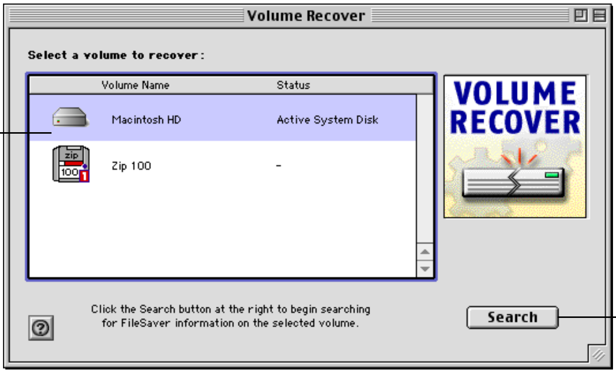
To search for FileSaver files:

1 Do one of the following:

- In the Norton Utilities main window, click the Volume Recover button.
- Choose Volume Recover from the Utilities menu.

- Drag the icon of the disk you want to search onto the Volume Recover icon.
- In the Norton Tools folder, double-click the Volume Recover icon.

The Volume Recover window appears.



Volume Name	Status
Macintosh HD	Active System Disk
Zip 100	-

Click the Search button at the right to begin searching for FileSaver information on the selected volume.

Select one or more volumes

Search the selected volumes

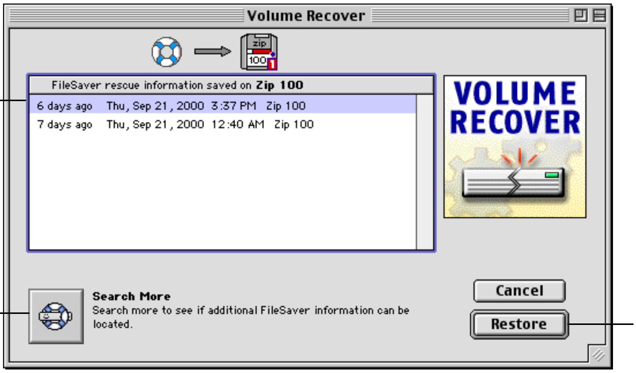
2 Select a disk and click Search.

Note: If the disk doesn't appear in the Volume Recover list, you can try to find it, and then search it for FileSaver information. See "Selecting missing disks" on page 61.

Volume Recover begins searching for FileSaver files.

Caution: If the FileSaver information is more than a few days old, you probably should not restore it. If the information is more than a week old, Volume Recover will prompt you to rebuild directories, and this provides the best chance of recovery. Restoring old FileSaver data can make future data recovery efforts difficult. An exception to this is the case where you have not used your computer for an extended period of time.

When Volume Recover finds FileSaver information files, they appear with their dates and locations.



FileSaver rescue information saved on **Zip 100**

6 days ago Thu, Sep 21, 2000 3:37 PM Zip 100
7 days ago Thu, Sep 21, 2000 12:40 AM Zip 100

Search More
Search more to see if additional FileSaver information can be located.

FileSaver file shows volume name and last saved date

Search for more FileSaver information files on the selected volume

Restore FileSaver information to the volume

Caution: If the files you wish to recover were created after the date of the most recent FileSaver information file, use UnErase to recover the newer files to a different volume before you perform any Volume Recover activity. Once those files are recovered, you can still use Volume Recover to restore the older FileSaver information and recover other files on the disk. For more information, see "Recovering erased files" on page 76.

---

3 If the located FileSaver information is not for the volume you wish to recover, or if you think there is more recent FileSaver information for the volume, click Search More.

Volume Recover tries searching the selected volume again.

If FileSaver information is still not found, Volume Recover lets you search the entire physical device.

Note: If Volume Recover finds FileSaver information that is more than a week old, it prompts you to rebuild directories. If the FileSaver information is several weeks old, or if no FileSaver files are found, FileSaver may not be protecting your disks correctly. If this occurs, check that FileSaver is active and properly configured to protect your files and volumes.

---

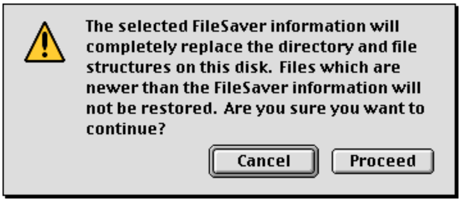
4 If the located FileSaver rescue information is for the volume you wish to recover, select the most recent FileSaver rescue information file.

Note: Always select the most recently updated FileSaver information file first. If the most recent update is damaged, run Volume Recover again and select an earlier information file.

---

5 With the FileSaver information file selected, click Restore.

When you click Restore, Volume Recover informs you that the disk's directory information will be replaced by the FileSaver information.



The selected FileSaver information will completely replace the directory and file structures on this disk. Files which are newer than the FileSaver information will not be restored. Are you sure you want to continue?

Before proceeding, be aware of the following:

- Any files created after the most recent FileSaver information file will not be recovered.
- Any file modified or deleted after the FileSaver information files were last saved will be recovered but may be damaged.
- You cannot undo this procedure.

6 Click Proceed to restore the FileSaver information to the selected volume.

If recovery is successful, Volume Recover displays a message.

7 Restart your computer. After you restart, the restored FileSaver information takes the place of the current disk information.

8 To select another FileSaver information file, go back to step 4 and repeat the process.

If the Volume Recover search does not locate any FileSaver files, the volume may be damaged, or no FileSaver information files may exist. Try using Rebuild Directories to restore the volume data.

Rebuilding directories

Sometimes missing files are not listed in a disk's directory because damage to the directory prevents the corresponding directory entries from being found. If your directory is damaged, you can use a feature in Volume Recover to rebuild it.

Rebuild Directories scans the hard disk for all file records, and creates a directory containing those records. Volume Recover will recover all available records, using this feature. This might include some files that you have intentionally deleted.

In older versions of Norton Utilities for Macintosh, UnErase was used to find the files on a damaged disk, but you had to recover those files to another volume. Rebuild Directories lets you bring those files back on their original disk, without having to back up all the files and reformat.

Rebuilding directories may also temporarily improve the performance of your system, especially on disks containing a lot of files, because it places catalog tree nodes in order according to the contents of the drive.

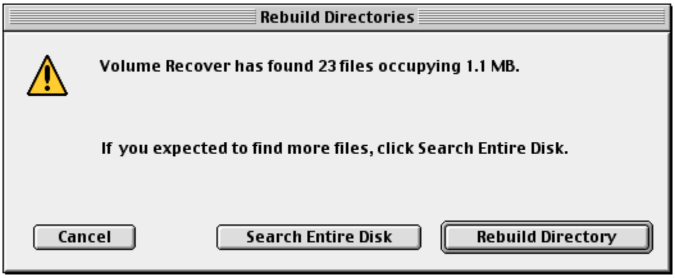
Warning: Use this feature with caution. Rebuild Directories can’t be undone.

To rebuild a disk’s directory, restart from the Norton Utilities for Macintosh CD, or from another startup disk. For more information, see “Running Norton Utilities from the CD” on page 12.

To rebuild a directory:

1. Start Volume Recover.
2. On the Disks menu, click Rebuild Directories.

Volume Recover scans the selected disk and displays an estimate of the number of directory items found, and the amount of space they occupy.



Rebuild Directories

Volume Recover has found 23 files occupying 1.1 MB.

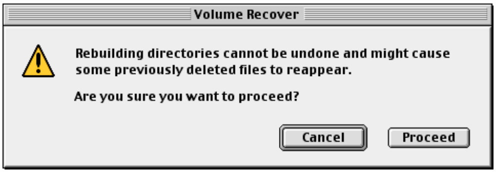
If you expected to find more files, click Search Entire Disk.

Your options are:

- Rebuild Directory: Proceeds to rebuild the directory with the discovered files.
- Search Entire Disk: Do not click this button unless damage to your disk is so severe that no other method can recover your missing files.

  When you click this button, Volume Recover scans the entire disk for all files. The additional files found by this scan might result in loss of valid files in the directory.

3 If the estimate is satisfactory, click Rebuild Directory.



Volume Recover

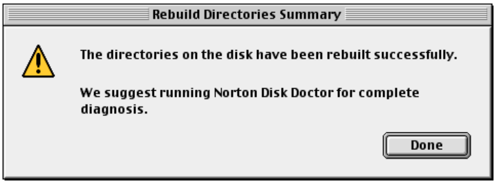
Rebuilding directories cannot be undone and might cause some previously deleted files to reappear.

Are you sure you want to proceed?

If your disk is badly damaged, Rebuild Directories might need to search the entire disk to ensure that all directory data is safely accounted for. This search can be time consuming. For example, a 4 GB drive might take ten minutes to rebuild.

4 When asked to confirm the warning message, click Proceed.

Volume Recover restores the directory entries.



Rebuild Directories Summary

The directories on the disk have been rebuilt successfully.

We suggest running Norton Disk Doctor for complete diagnosis.

5 Run Norton Disk Doctor to verify that the disk is in good condition. This precaution provides protection in case there are other structural problems on your disk that might still cause you problems.

CHAPTER

5

Speed Disk

As your disk fills up, files may become fragmented across the disk as they grow or shrink in size, and disk activity, such as reading from and writing to the disk, can be slowed down as the drive head hunts for the scattered locations of the file fragments.

Speed Disk improves overall disk performance by eliminating file fragmentation, consolidating free space and arranging your disk data for optimal use. As part of its regular operation, Speed Disk checks the readability of the sectors on your hard disk and makes sure that the file allocation information recorded in the directory corresponds to the actual files on the disk.

Use Speed Disk to:

- Defragment files, or when fragmentation exceeds the Moderate level, optimize the entire disk. For more information, see "Optimizing a disk" below.
- Optimize the placement of files on a disk according to the selected profile, for example, before mastering a CD or resizing a partition. For more information, see "Using built-in Speed Disk profiles" on page 119.
- View which files are fragmented and how badly they are fragmented. For more information, see "Defragmenting files" on page 112.

Speed Disk notifies you if it encounters problems, and prompts you to go to Norton Disk Doctor for diagnosis and repair.

Optimizing a disk

Speed Disk *optimizes* your hard disk. Optimization refers to the placement of files on the drive according to file type. For example, system files are placed together where they can be accessed efficiently. Desktop files, documents, and other frequently used files are placed adjacent to free space where they have room to grow without fragmentation.

Defragmentation vs. optimization

The terms *defragmentation* and *optimization* are often used interchangeably, but they are not the same.

- Defragmentation is the process of rearranging the way files are organized on a hard drive so that the data comprising each file is stored in contiguous disk blocks.
- Optimization maximizes the usable free space on a hard drive and groups files based on how they are accessed. The most frequently used files are placed where they can be accessed in the shortest time. Infrequently used files are placed out of the way. Free space is consolidated to avoid fragmenting newly added files, and extra space is added after major data structures so they can grow without immediately becoming fragmented again. Optimization can improve performance, both after initial optimization and on a continuing basis.

During normal file operations, file and free space fragments are created on the drive. As they are created, modified, and deleted, files can become larger and outgrow the original number of contiguous blocks allocated for them on a hard disk, or become smaller and no longer need all of their allocated space. For growing files, the Mac OS file system must find somewhere to save the overflow parts. For shrinking files, empty space might be left behind where the file once was.

Over time, fragments of a file might be scattered in several places, in a totally different area of the drive, away from the original location of the file. These multiple file fragments are tracked in the disk catalog.

How fragmentation affects overall performance

When files are saved or copied to a disk, there is no discrimination between types of files. On an unoptimized drive, all file types, including applications and data files, are intermingled.

When a fragmented file is accessed, drive performance is slower because the drive head must do more work to locate, load, save, and generally keep track of the fragments of the file.

High fragmentation levels affect a drive's overall performance, because more demands are placed on the drive read/write mechanism. If free space is also fragmented, the drive head is forced to hunt for adequate free space to store temporary files or newly added files.

Fragmentation also affects video and other multimedia performance. For example, if a multimedia file such as a movie is being played, and the movie file is fragmented, the player might have to wait for the disk head to scramble around for the next fragment to load.

Speed Disk optimizes fragmented files by rearranging file fragments into adjacent or contiguous blocks. When the disk head can access all the file data in one location, the file is read into memory faster.

Speed Disk can also optimize free space, creating contiguous free space on the drive. This improves system performance when writing new files, especially under low disk space conditions where free space fragmentation can cause large files to be fragmented the first time they are saved to disk.

In general, the default settings provide the best performance. You should change the default settings only if your files require special consideration. For information on Speed Disk's optimization options, see "Using built-in Speed Disk profiles" on page 119.

Optimization issue	**Suggestions**
Number of files	The more files on the drive, the more time is needed for optimization. You will need to consider the drive's total number of files and the file types, for example, large multimedia files or databases vs. numerous small document files. To get an idea of the disk's file composition, run Check Disk.
Number of file fragments	The more file fragments, the more time is needed for optimization.
Number of fragmented files	The greater the number of fragmented files, the more time is needed for optimization.
Free disk space	The more free disk space there is on the drive, the faster optimization will occur.

Drive size	The number of files and file fragments affect the amount of time needed for optimization. Optimizing a highly fragmented smaller drive might take longer than optimizing a lightly fragmented larger drive.
Drive speed	Some types of devices are slower than others. The slower the drive, the longer optimization will take. For example, USB devices are slower to optimize than SCSI, ATA, or FireWire devices.
Processor speed	The slower the processor speed, the more time is needed for optimization.

Initial optimization time

A drive's first optimization might take significantly longer than subsequent optimizations. Speed Disk must move the files and free space into the order described in "Deciding which profile settings to use" on page 108.

Preparing for optimization

Before optimizing any drives, you should make the following preparations:

Before optimizing, do this	Why you should do it
Run Norton Disk Doctor to identify and repair any bad blocks before running Speed Disk.	Although Speed Disk automatically checks for errors before optimizing, it's best to run Norton Disk Doctor to identify and repair any file or directory damage that could cause problems during optimization. Running Norton Disk Doctor also ensures that lost file fragments are not included in the optimization. For more information, see "Using Norton Disk Doctor" on page 52.
Delete temporary and obsolete files such as any Internet temporary files, the Trash, and so on.	This avoids the extra work of optimizing obsolete, unused, and trash files that consume optimization time and resources. Including these files in optimization means that useful space is occupied by useless files, causing the drive to become refragmented when these files are emptied from the Trash or erased from temporary folders.

Before optimizing, do this	Why you should do it
Complete any major software installations or uninstallations before optimizing.	This reduces the necessity to reoptimize after the installation or uninstallation. Typically, installation processes create temporary files, and occupy large amounts of space temporarily. Uninstalling programs after optimizing creates unnecessary work.
Back up your files.	It’s always a good idea to back up your data. Although Speed Disk maintains the integrity of your data, we strongly recommend that you back up important files before making any major changes to your drives, including optimization. Maintaining a schedule of regular backups is good practice at any time.
Make sure your disk driver has been updated with the latest version of the manufacturer’s formatting software.	It is important to make sure your computer is communicating with your hard disk drive properly before you optimize it. If you know you have the latest version of the driver software, you might still wish to update or reinstall the driver with that utility to ensure that the driver is functioning correctly when you optimize. If your hard disk is factory installed, use the hard disk setup software that came with your computer, for example, Apple’s Drive Setup utility. Otherwise, either use the software that came with the hard disk or contact the manufacturer for the current driver.
Remove any driver-level security software, or remove any other write protection on the disk.	Because some copy-protected software makes use of hidden files that might be moved during Speed Disk optimization, it might be necessary to uninstall certain copy-protected applications before optimizing, then reinstall them after optimizing to ensure that those files remain in their expected locations. For further information, consult the security application’s documentation.

Phases of optimization

Speed Disk goes through several phases in the course of optimization.

Phase	Activity
Checking Catalog B-Tree	Speed Disk checks the disk's directories to make sure that all data can be found and that there are no problems that prevent a successful optimization. If problems are found at this stage, run Norton Disk Doctor.
Analyzing files	Speed Disk analyzes the files found in the directory and gathers information about what categories the files fit into, and how many files of each file type are present. If also determines the degree of file and free space fragmentation.
Creating color image	Speed Disk creates a color map of the drive, showing the various categories of files.
Creating goal state	Speed Disk determines where each file will be placed during optimization, according to the profile selected.
Optimizing	Speed Disk moves the files into the areas of the drive assigned to their types, as described in "Using built-in Speed Disk profiles" on page 119.

About unmovable anchor files

Some files and file fragments are classed as unmovable. Files designating bad blocks on the drive, and some types of security files can't be moved.

Fragments on the drive identified by Speed Disk as unmovable are not moved during optimization. You can also designate any file or group of files to be unmovable. For more information, see "Specifying an anchor" on page 127.

Deciding which profile settings to use

Speed Disk normally runs with the General Use optimization setting. However, there are other settings that Speed Disk can use for purposes such as CD mastering, multimedia use, or just to consolidate free space. For more information, see "Using built-in Speed Disk profiles" on page 119.

Note: Because some copy-protected software makes use of hidden files that may be moved during Speed Disk's optimization, it may be necessary to uninstall certain copy-protected applications before optimizing, then reinstall them after optimizing to ensure that those files remain in their expected locations. The Speed Disk Profile Editor lets you create an optimization profile to accommodate this requirement without uninstalling the application. For further information, see "Creating custom Speed Disk profiles" on page 120, and consult your copy-protected application's documentation.

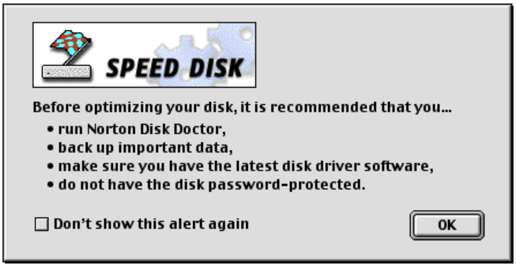
If you want to optimize your Startup Disk, you will need to restart your computer from another disk or CD that contains the current version of Mac OS, such as the Norton Utilities for Macintosh CD. For more information, see "Optimizing a startup disk" on page 114.

To start Speed Disk:

1 Do one of the following:

- Double-click the Speed Disk icon in the Norton Tools folder.
- In the Norton Utilities main window, click Speed Disk.

Note: A dialog box displays recommended precautions to take before running Speed Disk.



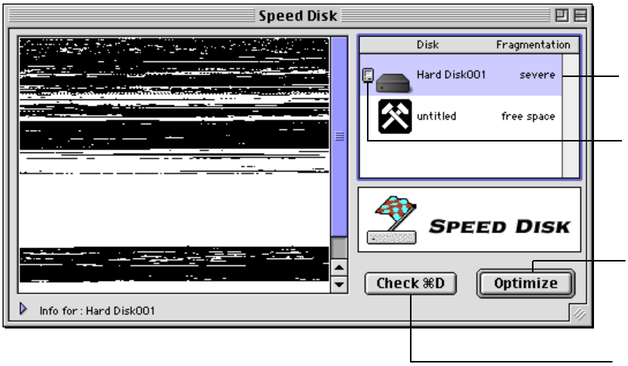
Before optimizing your disk, it is recommended that you...

- run Norton Disk Doctor,
- back up important data,
- make sure you have the latest disk driver software,
- do not have the disk password-protected.

2 Read the information, and then click OK.

Note: Be sure you have read and taken the precautions outlined under "Preparing for optimization" on page 106 before continuing with optimization.

The Speed Disk main window appears. Available disks are listed, with their fragmentation status, in the upper-right panel of the window.



Disk fragmentation level

Small icons indicate optimization potential

Begin optimizing

Find out if optimization is needed

The smaller icons to the left of the disk icons indicate each disk's potential for optimization:

- Macintosh icon: The disk contains the active system files and can't be optimized.
- Application icon: The disk contains the Speed Disk application and can't be optimized.
- Lock icon: The disk is write-protected and can't be optimized or defragmented.

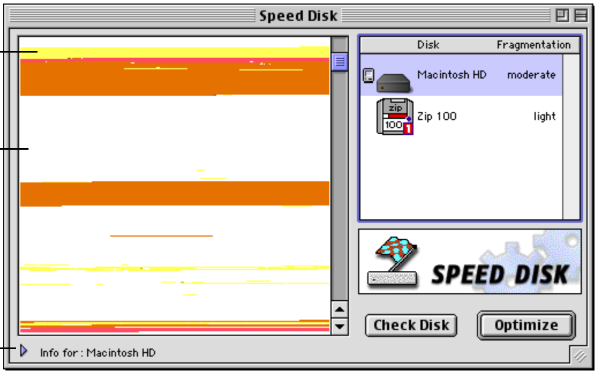
3 Select the disk to optimize.

Speed Disk displays a disk map, with used areas displayed in black and free areas in white.

4 Click Check Disk to generate a fragmentation summary.

Note: You must run Check Disk before Speed Disk can estimate the disk's fragmentation level. If you already know you want to optimize a disk, you do not need to run Check Disk first.

Speed Disk checks the selected disk, redraws the disk map, and reports the amount of file fragmentation.



Disk is redrawn to reflect file types

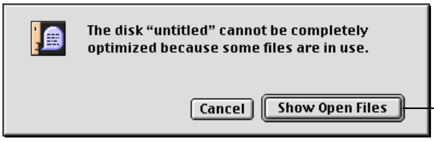
Blocks move with disk activity during an optimization

Display or hide information window

5 Click Optimize.

Speed Disk starts optimizing the selected disk.

If you are trying to optimize your disk and documents or other non-system files are open, a message appears.



The disk “untitled” cannot be completely optimized because some files are in use.

Click to display open files

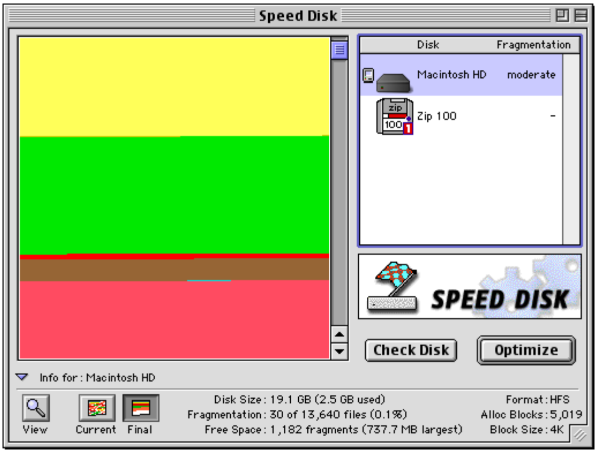
6 If this message appears, click Show Open Files to display what files are open, so you can close them and continue optimizing.

Note: To view a list of fragmented files, and select individual files for defragmentation, see “Defragmenting files” on page 112.

If you are optimizing your boot disk you will have to restart from the Norton Utilities CD, or from another Startup Disk. For more information, see “Optimizing a startup disk” on page 114.

The time for optimization varies, depending on the disk fragmentation and the type of media. For example, USB devices will be much slower to optimize than SCSI, ATA, or FireWire devices.

When optimization is complete, Speed Disk has defragmented files and arranged file types for optimal use.



Disk	Fragmentation
Macintosh HD	moderate
Zip 100	-

Info for : Macintosh HD

Disk Size : 19.1 GB (2.5 GB used)
Fragmentation : 30 of 13,640 files (0.1%)
Free Space : 1,182 fragments (737.7 MB largest)
Format : HFS
Alloc Blocks : 5,019
Block Size : 4K

Note: If FileSaver protection is enabled for a disk, Speed Disk automatically updates FileSaver information when it finishes optimizing. For more information, see “Protecting disks with Norton FileSaver scans” on page 132.

About the disk map

The disk map indicates which parts of the disk are occupied and which are free, and lets you follow the optimization progress.

- After Speed Disk checks the disk, the map is redrawn with each file type shown in a different color, or in shades of gray on monochrome monitors. White space indicates areas of the disk where no data is stored.
- If the map is too large to fit in the window, you can scroll up and down to view disk map activity.
- Use the Detail View to view details of each block in the disk map. For more information, see “Using advanced options” on page 115.

Defragmenting files

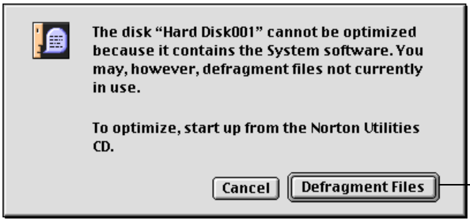
You cannot optimize files that are in use by the Macintosh operating system. Therefore, you cannot completely optimize a disk if it is currently in use as your Startup Disk. If you choose Optimize with your Startup Disk selected, a message informs you that you can't optimize this disk until you restart from the Norton Utilities CD.

You can, however, defragment files on volumes that have files in use. Although defragmenting files is not as complete as the entire optimization process, it is likely to improve your disk performance. Defragmenting your files also increases the likelihood in the future of recovering accidentally deleted files intact rather than in fragments. You can choose to defragment all files or select only the largest or most fragmented files.

To defragment all files:

1 Run Speed Disk, as described in the previous procedure, "To start Speed Disk:" on page 109.

A message informs you that you can't optimize the Startup Disk.



The disk "Hard Disk001" cannot be optimized because it contains the System software. You may, however, defragment files not currently in use.

To optimize, start up from the Norton Utilities CD.

Click to defragment files

2 Click Defragment Files.

Speed Disk defragments all the files on the selected disk.

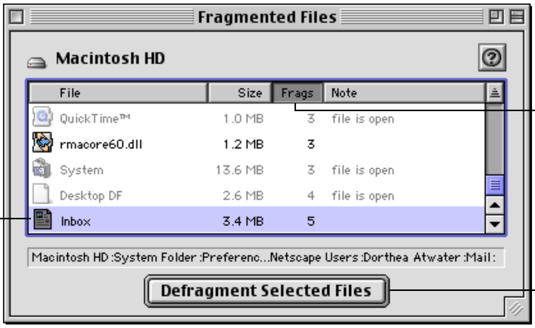
You can also defragment selected files without performing a complete optimization. For example, if you are working with large files but have recently optimized your disk, use Speed Disk to find out which files are fragmented and how badly they are fragmented. If certain frequently used files—especially large database files—are fragmented, it is wise to defragment them even if the total fragmentation percentage is low.

To view and defragment selected files:

1 Open Speed Disk.

2 Choose Show Fragmented Files from the Explore menu.

The Fragmented Files dialog box lists all fragmented files, their sizes, and the number of fragments.



File	Size	Frags	Note
QuickTime™	1.0 MB	3	file is open
rmacore60.dll	1.2 MB	3	
System	13.6 MB	3	file is open
Desktop DF	2.6 MB	4	file is open
Inbox	3.4 MB	5	

Macintosh HD :System Folder :Preferenc...Netscape Users :Dorthea Atwater :Mail :

Select one or more files to defragment

Click a column heading to sort

Click to defragment selected files

Dimmed files can't be defragmented. The reasons for their unavailability are listed in the Note column.

3 To sort the list in a different order, click the File, Size, or Frags column heading.

Note: There must be enough adjacent free space on the volume for the files to be fully defragmented. If the free space is too fragmented, you may need to optimize the entire drive, or delete files from the drive to increase available free space. Look at the detail view to see which files in the disk map lie adjacent to free space and might be usefully deleted.

---

4 Select files for defragmentation:
- Click one file to select it.
- Shift-click to select a range of adjacent files.
- Command-click to select non-adjacent files.
- Choose Select All from the Edit menu to select all available files.

5 Click Defragment Selected Files.

Optimizing a startup disk

To fully optimize your startup disk, you must restart your computer from another disk, or from another volume containing the Macintosh OS, such as your Norton Utilities CD.

To optimize a startup disk:

1. Restart your computer from the Norton Utilities for Macintosh CD. For more information on restarting from the CD, see "Running Norton Utilities from the CD" on page 12.

   The Norton Utilities CD window appears.

2. In the Norton Utilities CD window, double-click the Norton Utilities icon.

   The Norton Utilities main window appears.

3. Click the Speed Disk button on the Norton Utilities main window.

   The Speed Disk window appears.

4. Select your startup disk.
5. Click Optimize.

Using advanced options

With the advanced options in Speed Disk, you can control several aspects of the optimization. These options are accessed from the Options and Explore menus.

- If you only want to defragment, choose Show Fragmented Files from the Explore menu.
- To check the integrity of your disk and data during an optimization, choose Verify Media, Verify Directories, and Verify Data from the Options menu. Choosing these options causes Speed Disk to include these activities as part of its optimization.

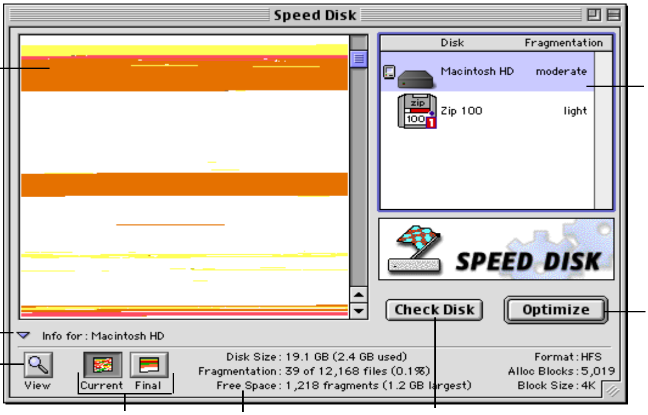
  Note: Choosing Verify Media will significantly increase the time required to optimize.

- To locate a file in the disk map, choose Show File In Map.

To use advanced options:

1. Choose Show Info from the Explore menu.

More information appears at the bottom of the Speed Disk main window.



Disk	Fragmentation
Macintosh HD	moderate
Zip 100	light

Info for : Macintosh HD

Disk Size : 19.1 GB (2.4 GB used)
Fragmentation : 39 of 12,168 files (0.1%)
Free Space : 1,218 fragments (1.2 GB largest)

Format : HFS
Alloc Blocks : 5,019
Block Size : 4K

Blocks in the disk map move in tandem with optimization activity

Display or hide information window

Open Detail View window

List of disks with fragmentation level; double-click a disk to start optimizing

Begin optimizing

Display current or final view disk map

Display status of disk fragmentation

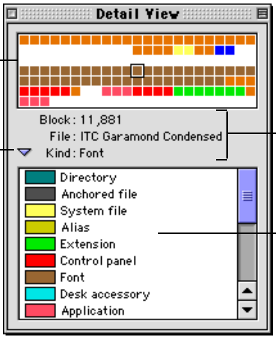
Find out if optimization is needed

This information window gives more detail about the fragmentation of the disk, as well as reporting the disk's format, HFS or HFS Plus, and the number and size of allocation blocks on the disk.

2 Click View.

When you move the cursor over the disk map, the cursor becomes a small magnifying glass that lets you see the Detail View. The Detail View displays the block number and, after Check Disk is run, the filename and type of file under the magnifying glass.

If you have already run Check Disk, the Detail View window also reports the name and kind of the file occupying the block under the cursor.



Block : 11,881
File : ITC Garamond Condensed
Kind : Font

- Directory
- Anchored file
- System file
- Alias
- Extension
- Control panel
- Font
- Desk accessory
- Application

Magnification of area under cursor

Click to open or close the color legend

Block number, filename, and file type

Color legend describes file types on the disk map

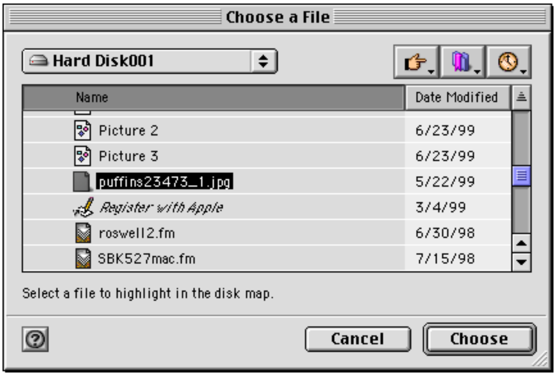
- To view the color legend, click the Kind triangle in the lower left of the Detail View window.
- Scroll down the list of colors to view all the file types identified by the disk map.

Viewing a file in the disk map

You can locate a filename and have Speed Disk identify its location in the disk map.

To locate a file in the Disk Map:

1 Choose Show File In Map from the Explore menu.



Select a file to highlight in the disk map.

2 In the Choose a File dialog box, select the file you want to find, and then click Choose.

3 Norton Speed Disk makes the file blink alternately black and white in the Disk Map.

Tip: If the file is small, it may be hard to see the blinking blocks in the Disk Map. Use the Detail View to help locate the file.

Setting Speed Disk options

The Options menu includes commands to customize the optimization process. A checkmark appears before each option used during the optimization.

The Verify Media and Verify Directories commands and options both check the readability of the sectors on your hard disk and make sure that the file allocation information recorded in the directory corresponds to the actual files on your disk. If there are discrepancies, you are prompted to go to Norton Disk Doctor for diagnosis and repair of the problem.

To ensure that your hard disk does not contain damage that could be made worse by Speed Disk, make sure you run Norton Disk Doctor before running Speed Disk, or make sure that Verify Media and Verify Directories options are selected in the Options menu before you start. It's also a good idea to always run the Check Disk procedure before you optimize.

- Verify Media

  Identifies bad blocks to prevent files from accidentally being written to these areas. If bad blocks are found, you should run Norton Disk Doctor to correct them or mark them from further use. Choosing Verify Media will significantly increase the time required to optimize.

  Note: Marking bad blocks does not eliminate them from the drive. You should back up drives containing bad blocks and reformat them using the disk's formatting software to ensure future data integrity.

- Verify Directories

  Checks directory structures and verifies that the directories and files match before it optimizes. This option runs a light version of a Norton Disk Doctor scan. If you always run Norton Disk Doctor immediately before Speed Disk, you can deselect this option. Otherwise, leave it selected.

- Verify Data

  Automatically confirms that data is accurately written to disk while it is optimizing. This option causes optimization to proceed much more slowly.

- Wipe Free Space

  Removes any residual data left in unused disk space after it finishes optimizing. This function is the same as choosing the Wipe Unused Space option in Wipe Info. For more information, see "Wiping unused disk space" on page 144.

- Optimize Directories

  Improves the performance of your hard disk by reducing and consolidating the notes used to hold file records in the disk's directories, and optimizing the records within those notes in use.

- When Finished

  Indicates what Speed Disk should do when it is finished optimizing.

Consolidating free space

Even when the total disk fragmentation is low, you might also want to use Speed Disk to create a larger block of free disk space for virtual memory. Free space can be fragmented just as a file can. Some applications require large areas of contiguous free space. In addition, highly-fragmented free space causes files to become fragmented more quickly. You might have 10 MB free on a drive, but it may be fragmented into 100 fragments of 100 K each.

Free space can't be defragmented directly. To consolidate free space, either optimize your disk completely or use the disk map to identify files that cause free space to be fragmented. You can back up and delete these files.

Using built-in Speed Disk profiles

You can customize the way files are optimized by using Speed Disk profiles. You can choose from the following options:

- General Use

  Optimizes and groups similar file types together. Places free space in the middle of the drive. Places items in the Trash and Temporary Items folders adjacent to free space so they will not cause the free space to fragment when they are deleted.

- Multimedia

  Quickly maximizes adjacent free space without optimizing. Ideal when preparing to create a very large file that should not be fragmented.

  Caution: Using the Multimedia profile, Speed Disk rearranges files quickly, but does not defragment them or optimize their placement. Selecting this profile may even cause further file fragmentation.

- Software Development

  The same as General Use, but moves project files and source files close to free space.

- CD-ROM Mastering

  Optimizes and places files, including hidden FileSaver files, at the front of the disk. This profile assumes no files will be deleted from the disk before mastering.

- Recently Used Files

  Defragments only the most recently used files, and places them next to free space. Does not optimize the disk. This profile is the ideal way to quickly defragment frequently-used files.
- Disk Resizing

  Like CD-ROM Mastering, but also places items in Trash and Temporary Items folders adjacent to free space. Useful when preparing to resize a partition created by formatting software.
- Speed Disk 3.2

  Uses the optimization pattern from Speed Disk 3.2. The Speed Disk 3.2 profile uses fewer file types than the other profiles. If you optimize a disk with this profile and then check the disk using another profile, the disk may not appear to be optimized.

Creating custom Speed Disk profiles

Using Speed Disk Profile Editor, you can customize your own Speed Disk profiles if the built-in profiles don't meet your needs. The Speed Disk Profile Editor is located in the Norton Tools folder.

About the Speed Disk Profile Editor

The Profile Editor lets you create, manage, and view customized Speed Disk profiles. You can use the Profile Editor to create profiles for specific performance requirements to match your computing activity.

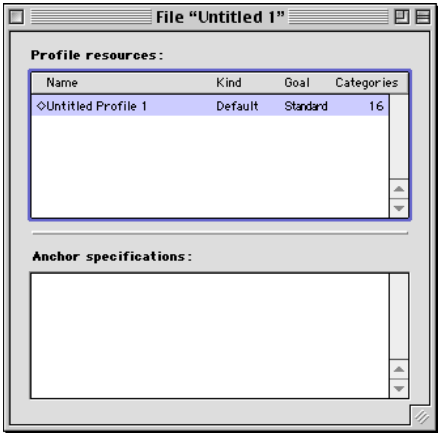
Although the built-in Speed Disk profiles meet most optimization needs, the Profile Editor lets you expand on these to fine tune your computer's drive performance.

To create a profile:

1 Double-click the Speed Disk Profile Editor icon.

SD Profile Editor

2 On the Edit menu, click New Profile (Command-K).



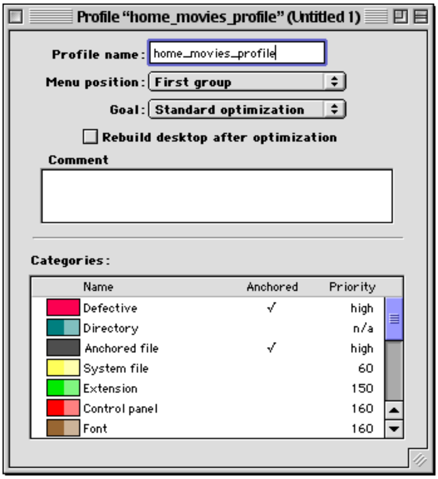
Profile resources:

Name	Kind	Goal	Categories
◇Untitled Profile 1	Default	Standard	16

Anchor specifications:

3 In the resource window, double-click the Untitled profile to open the Profile window.

4 In the Profile Name field, type a distinctive name for this profile.



Profile name: home_movies_profile

Menu position: First group

Goal: Standard optimization

☐ **Rebuild desktop after optimization**

Comment

Categories:

	Name	Anchored	Priority
🟥	Defective	✓	high
🟦	Directory		n/a
⬛	Anchored file	✓	high
🟨	System file		60
🟩	Extension		150
🟥	Control panel		160
🟫	Font		160

5 Click a Menu position.

This specifies where the profile appears in the list of profiles on Speed Disk's Optimize For menu.

6 Click a Goal.

Goal	Description
Standard optimization	Defragments files, groups them by category, and arranges the categories in order in the Categories list.
Minimal optimization	Quickly defragments files and moves them to the front of the disk, without grouping them by category or moving them to a specific location on the disk.
Defragment only	Defragments as quickly as possible, without grouping them by category or moving them to a specific location on the disk.
Maximize free space	This consolidates all free space. Files are not defragmented unless they are in the way.

7 Check or uncheck the setting for Rebuild Desktop After Optimization.

When this is checked, Speed Disk rebuilds the Desktop after optimizations that use the selected profile. This is only recommended for CD Mastering.

8 Type an optional comment in the Comment field to describe the profile.

9 Click Categories.

Category setting	Description
Name	The category name. A category is a file type.
Anchored	Whether a file is unmovable. Certain types of files, including some copy protection and security programs, can only be moved by their creator applications.
Priority	The requirement that a file be located in a specific place on the disk.

For more information, see “Editing profile categories” on page 123.

10 On the File menu, click Save.

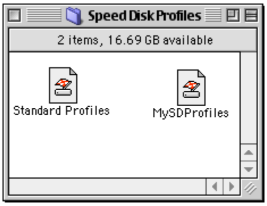
You should save the resource file in the Speed Disk Profiles folder in the Norton Tools folder. If the resource file is saved to a different location, the custom profiles will not appear on the Speed Disk

Optimize For menu unless explicitly added with the Add Profiles command.

To edit an existing profile:

1. In the Norton Tools folder, double-click Speed Disk Profile Editor.
2. Open the file containing the profile you want to edit.
3. On the Edit menu, click Open Profile, and select the profile you want to edit.

   You can also double-click a profile resource in the Finder.



4. In the Profiles window, double-click a profile.
5. Make changes to the selected profile.

   When optimizing a disk, Speed Disk must categorize every type of file on the disk. The order in which categories are listed determine where on the disk Speed Disk will place the file.

   See the setting information in the procedure "To create a profile:" on page 120.
6. To change the ordering of categories, drag them to a new position in the list. Except for anchored files, Speed Disk will arrange files on the disk in the same order as categories are displayed in the list.
7. On the File menu, click Save.

Editing profile categories

Categories are groups of files with the same characteristics. Speed Disk arranges files on disk according to their categories.

You can see a file's type in the disk map's Detail View. For information on using Detail view, see "About the disk map" on page 112. To see an application's file type in the Finder, use the Get Info command.

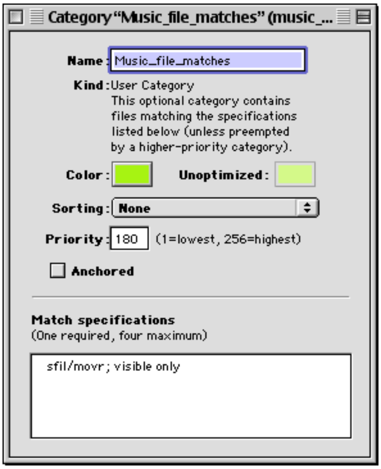
When you create a profile, it already contains the categories necessary to guarantee a successful optimization. You can change only the names of these categories and the associated color displayed with Speed Disk disk map. To the required categories, you can add predefined optional categories and user-defined categories suited to your optimization needs.

There are eight different kinds of categories. Certain category types (Defective, Directory, Anchored, Attribute, and Free Space) are required to appear in every profile. Dragging or pasting a category type into a profile replaces the existing category of the same type. Other optional category types (Desktop and FileSaver Index), can appear only once in a profile, so dragging or pasting one into a profile can also replace an existing category.

Theoretically, you can assign any category to any file's type. However, it's best to use your installed applications' file types.

To edit Speed Disk profile categories:

1 Double-click a category.



Category "Music_file_matches" (music_...

Name: Music_file_matches

Kind: User Category
This optional category contains files matching the specifications listed below (unless preempted by a higher-priority category).

Color: 🟩 Unoptimized: 🟩

Sorting: None

Priority: 180 (1=lowest, 256=highest)

☐ Anchored

Match specifications
(One required, four maximum)

sfil/movr; visible only

2 Depending on the category's file type, you can change elements of the category that appear in the Speed Disk Profile Editor window.

Item	Description
Name	The name of the category.
Color	You can change the color by clicking the color and selecting another from the Mac OS color picker. The Unoptimized color will be a muted version of the selected color.

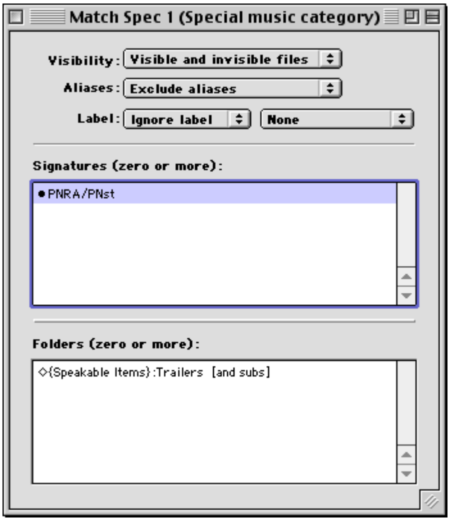
Sorting (User-defined and optional)	The order in which the files are physically placed on the drive within this category. None: No sorting will occur during optimization. Ascending Modification Date: Files are sorted with the most recent date closest to the end of the disk. Descending Modification Date: Files are sorted with the earliest date closest to the end of the disk.
Priority (User-defined and optional)	The requirement that a file be assigned to this category. For example, anchored files (see page 127) have the highest priority to remain at their anchored position, even if the optimization process would otherwise place a different file in that location. The priority values are: 1=lowest, 256=highest. If a file matches more than one category, it is assigned to the highest-priority category that it matches.
Anchored (User-defined and optional)	Whether this category is anchored (unmovable) or not. The most common reason not to move a file is that it is a special security file installed for copy protection purposes. If you own software that installs such a file, you can create a custom specification for that file to anchor it. You can then run Speed Disk and optimize your drive without having to uninstall and reinstall that software.
Match Specifications (User-defined and optional)	What file type specifications match. Double-click the default match specification to launch the Match Specifications window. See "Working with match specifications" below, and "Specifying an anchor" on page 127.

Working with match specifications

Files can be matched to any specified category in a Speed Disk Profile, so that they are included in the optimization activity for that category. You can edit the match specification for any category so that files matching that specification will be included in that category.

To edit a match specification:

1. Click a match specification.
2. In the Match Spec window, select a setting.



Match Spec 1 (Special music category)

Visibility: Visible and invisible files

Aliases: Exclude aliases

Label: Ignore label None

Signatures (zero or more):

● PNRA/PNst

Folders (zero or more):

◇{Speakable Items}:Trailers [and subs]

3. You can change the following features:

Feature	Description
Visibility	Choices are: Visible and Invisible files. Visible files only. Invisible files.
Aliases	Whether to include aliases or not.
Label	Whether to consider the Finder's labels as part of the criteria, and if so, which label to match.
Signatures	What signatures, if any, are associated with the specification. If no signatures are listed, a file's signature will be ignored for this specification.
Folders	What folders, if any, are associated with the specification. Only files in these folders are considered to match the specification. If no folders are listed, a file's folder will be ignored for this specification.

4. Close each window.
5. On the File menu, click Save.

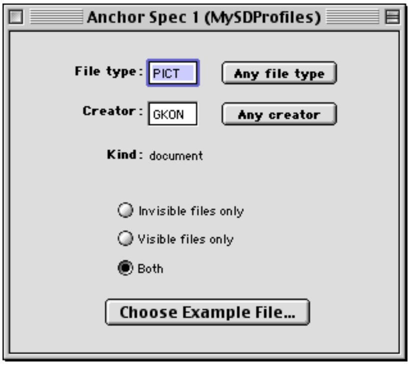
Specifying an anchor

Any file that should not be moved during optimization can be identified using an anchor specification. For example, some copy protection schemes use a file's location to determine if an authorized copy of the program is loaded on the computer. For your convenience, anchor specifications apply to all profiles installed or added to Speed Disk.

Edit the anchor specification by entering the file type and creator codes. You can then edit the match specification for that category, so that files matching that specification will be part of that category and will be anchored.

To edit anchor specifications:

1. In the resource window, double-click an anchor specification.
2. In the Anchor Spec window, select a setting to change.


Anchor Spec 1 (MySDProfiles)

File type: PICT

Creator: GKON

Kind: document

○ Invisible files only
○ Visible files only
● Both

3. To enter File Type and Creator codes, do one of the following:
   - Click Choose Example File and select a file with the File Type and Creator codes you want.
   - Click Any File Type or Any Creator to specify one of these for the anchor spec.
4. Select file visibility:
   - Invisible files only
   - Visible files only
   - Both (visible and invisible files)

5 Close the Anchor Spec window.

6 On the File menu, click Save to save the resource document with the changes to the anchor spec.

Specifying match signatures

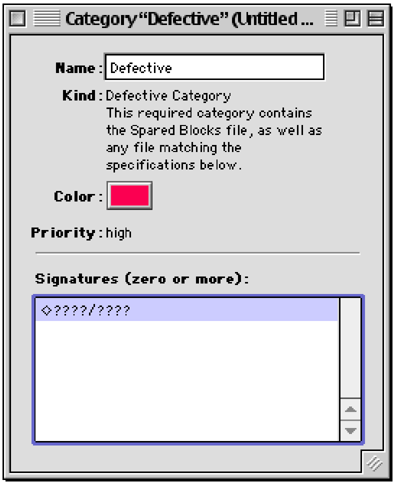
The Signature window works in the same way as the Anchor Specification window but it does not have file visibility choices. It lets you specify a file signature as one of the user-defined match specification categories.

To specify match signatures:

1 In a profile, double-click an optional category, for example, Desk Accessory.

2 In the category window, select the Signatures window.

3 On the Edit menu, choose New Signature Spec.



Category "Defective" (Untitled ...

Name: Defective

Kind: Defective Category
This required category contains the Spared Blocks file, as well as any file matching the specifications below.

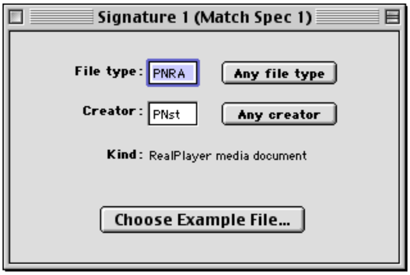
Color: 🟥

Priority: high

Signatures (zero or more):

◇????/????

4 In the Signatures box, double-click the undefined signature. You can also click in the Signatures box and choose New Signature Spec from the Edit menu.



File type: PNRA
Creator: PNst
Kind: RealPlayer media document

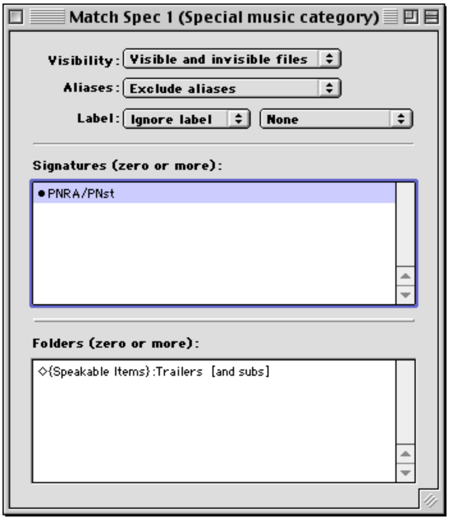
5 Use the procedure in “To edit anchor specifications:” on page 127, to select a File Type and Creator.

Specifying match folders

A Folder Specification window lets you view and edit a folder specification for a user-defined match specification.

To specify a match folder:

1 Follow the instructions in “To edit anchor specifications:” on page 127 to select the category and match specification.

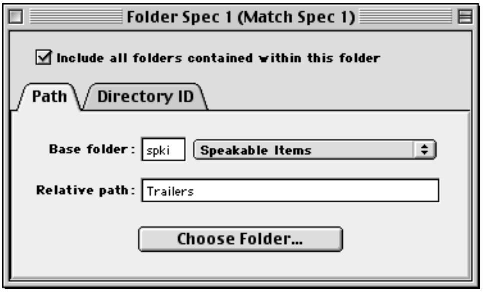


Visibility: Visible and invisible files
Aliases: Exclude aliases
Label: Ignore label None

Signatures (zero or more):
● PNRA/PNst

Folders (zero or more):
◇{Speakable Items}:Trailers [and subs]

2 Highlight the Folders box and choose New Folder spec from the Edit menu.



☑ Include all folders contained within this folder

Base folder: spki Speakable Items

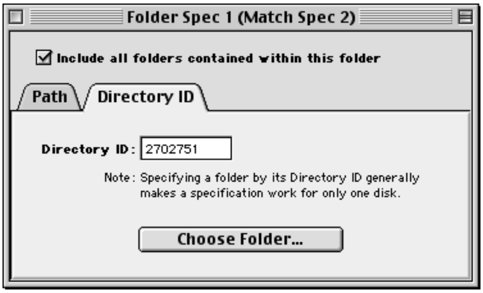
Relative path: Trailers

3 When Include all folders contained within this folder is checked, Speed Disk will consider all folders within the specified folder part of the match specification.

4 A folder may be specified either by its directory ID or by the path to the folder. On the path tab, you may enter the following data, or choose a folder that matches the specification you want:

- Base folder: Type the specification corresponding to a standard folder type or select a folder type from the pop-up menu.
- Relative Path: Type a directory path relative to the standard folder specified above. To specify an absolute path, type the path from the root.

5 On the Directory ID tab, type the directory ID for the folder.



☑ Include all folders contained within this folder

Directory ID: 2702751

Note: Specifying a folder by its Directory ID generally makes a specification work for only one disk.

6 For either Path or Directory ID, you may click Choose Folder to browse to the desired folder.

CHAPTER

6

Norton FileSaver

Norton FileSaver provides two important functions that are essential to the performance of Norton Utilities.

- It scans your disks at prescribed intervals for directory damage and file fragmentation. If Norton FileSaver detects a problem, it prompts you to run Norton Disk Doctor. If it detects significant file fragmentation, it warns you to run Speed Disk.
- It keeps track of all the files you change, add or delete and saves critical disk information that can be used by Norton Disk Doctor, Volume Recover, and UnErase to restore your disk or recover your files. It saves information about the location of files that are thrown away, and the directory structure of the protected disks.

This chapter describes how to use Norton FileSaver to:

- Select disks for protection. See "Protecting disks with Norton FileSaver scans" on page 132.
- Change when FileSaver scans your disk for problems, updates disk directory information, or displays alerts. See "Changing Norton FileSaver settings" on page 133.
- Use or configure Hot Keys. See "Using Hot Keys" on page 136.
- Respond to Norton FileSaver messages. See "Responding to Norton FileSaver alerts" on page 138.

When you fully install Norton Utilities, Norton FileSaver is already set up and turned on. The only time you need to interact with Norton FileSaver is if it encounters a problem or if it reminds you to do something. In these cases, it displays an alert dialog box that tells you what to do. For more information, see "Responding to Norton FileSaver alerts" on page 138.

Note: Although Norton FileSaver scans and checks your disks for most problems, it does not repair or check for minor, non-data threatening errors, such as bad modification dates. You should still run Norton Disk Doctor regularly to check the integrity of your disk or if your disk begins to act strangely.

Protecting disks with Norton FileSaver scans

Norton FileSaver maintains two files with volume information, in case incorrect information is saved to one file. Each time you restart your Macintosh, Norton FileSaver activates the file that was inactive during your previous session and updates only the active file during the current session. For computers that are left on all the time, Norton FileSaver switches active files every twenty-four hours. If directory damage occurs during the session, that damaged directory information could be saved to the active Norton FileSaver file, but you still have the file from your previous session.

When you select a disk for protection, the following information is saved in the Norton FileSaver files:

- Location of most recently deleted files

  Actual number of files tracked varies, depending on the attributes of the files thrown away. Norton FileSaver purges old information from the FileSaver information file to make room for newly deleted files.
- Directory information for the disk

  Norton Disk Doctor and Volume Recover can use this information to restore a disk.

You should always keep Norton FileSaver on and activate protection for each of your disks. If you performed the Easy Install, Norton FileSaver was added to your Control Panels folder and is turned on. If you didn’t perform the Easy Install, you may need to set up Norton FileSaver manually.

Disabling Norton FileSaver

Whenever you restart your computer with Extensions Off, you are also disabling Norton FileSaver. You may wish to disable Norton FileSaver temporarily if you need to restart your computer and you want to prevent FileSaver from updating the directory information (for example, if directory damage might have occurred). You can also use a Hot Key to prevent

Norton FileSaver from updating. For more information about using Hot Keys, see "Using Hot Keys" on page 136.

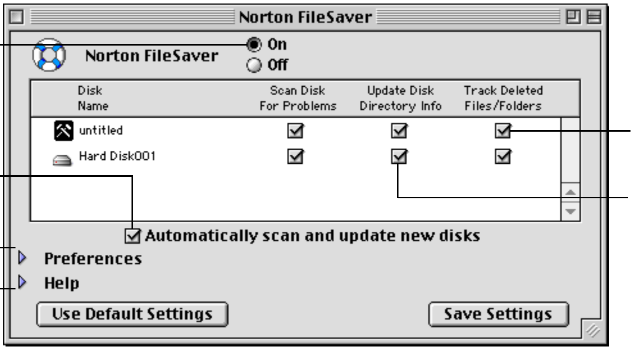
Changing Norton FileSaver settings

By default, Norton FileSaver scans your disks for problems when your computer has been idle for thirty minutes, or when you shut down your computer. You can prevent Norton FileSaver from updating its files, or you can update them yourself using a Hot Key. By default, Norton FileSaver scans your disk when your computer has been idle for thirty minutes, when you shut down, or after an improper shut down (for example, when your computer has crashed).

To review or change Norton FileSaver settings:

1 Choose Control Panels from the Apple menu and then choose Norton FileSaver.

You can also click the Norton FileSaver button on the Norton Utilities main window.



Norton FileSaver

Norton FileSaver ● On ○ Off

Disk Name	Scan Disk For Problems	Update Disk Directory Info	Track Deleted Files/Folders
untitled	☑	☑	☑
Hard Disk001	☑	☑	☑

☑ Automatically scan and update new disks

Turn Norton FileSaver Protection on or off

Select to have Norton FileSaver update new disks

Hide or display Preferences and Help panels

Track deleted files and folders

Select to save information for the disk

2 In the Norton FileSaver window, make sure the On button is selected.

Note: Turning off Norton FileSaver only disables it until you turn it back on. It continues to remember which disks are selected for protection. If you turn off Norton FileSaver, it warns you that Volume Recover will not be able to recover your disk without FileSaver protection.

---

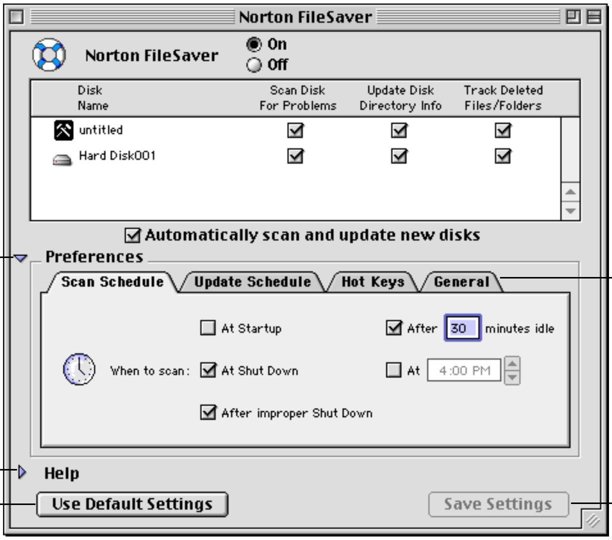
3 Select disks to be protected. By default, all disks are selected for protection. To change a disk setting:

- Select the checkbox under Scan Disk For Problems to indicate which disks should be regularly monitored for any problems.

- Select the checkbox under Update Disk Directory Info to indicate which disks you want protected with FileSaver data protection.
- Select the checkbox under Track Deleted Files/Folders to have Norton FileSaver keep track of the files you delete. This setting should be turned off only if the disk is used primarily for Internet temporary files, such as Web browser cache and temporary files.

4. By default, the setting Automatically Scan And Update New Disks is selected. This lets Norton FileSaver scan and protect new disks without you having to configure the control panel. Deselect if you do not want this option activated.
5. Click the Preferences triangle to display the Preferences tabs.

   The Preferences tabs appear in the lower part of the window.



Norton FileSaver ● On ○ Off

Disk Name	Scan Disk For Problems	Update Disk Directory Info	Track Deleted Files/Folders
untitled	☑	☑	☑
Hard Disk001	☑	☑	☑

☑ Automatically scan and update new disks

Preferences

When to scan: ☐ At Startup ☑ At Shut Down ☑ After improper Shut Down ☑ After 30 minutes idle ☐ At 4:00 PM

Hide or display Preferences settings

Click a tab to bring it to the front

Click to see help on all settings

Click to restore installed settings

Click to save new settings

6. Click the Help triangle to see help messages for each Preferences tab.
7. You can change the following Norton FileSaver settings:
   - Scan Schedule

     Specify when Norton FileSaver scans your disks to check for problems. Norton FileSaver is preset to scan before shutting down or when you restart after your computer has crashed, shut down improperly, or after 30 minutes idle.
   - Update Schedule

     Specify how often Norton FileSaver updates the information in its directory files.

Note: If Norton FileSaver does not update information on a regular basis, Volume Recover may not be able to effectively recover your disk in an emergency.

- Hot Keys

  Keyboard combinations for Norton FileSaver shortcuts.
- General

  Configure Norton FileSaver messages, including whether to be prompted to run Speed Disk, and how long to display Norton FileSaver messages before closing them automatically.

8 When you make changes to any setting, click Save Settings.

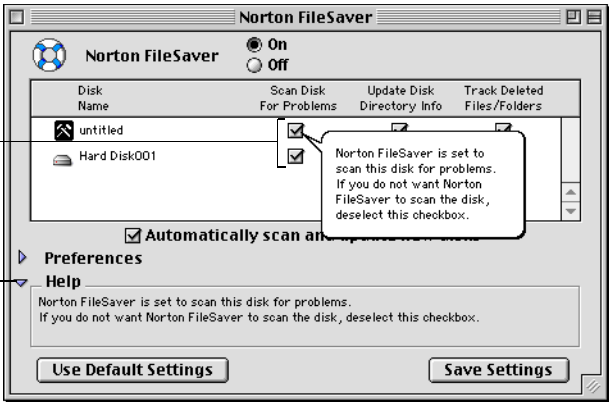
You can also choose Save from the File menu.

9 Click the close box to quit Norton FileSaver.

Viewing Norton FileSaver help

Norton FileSaver has built-in help that describes each setting. You can access three types of help:

- Norton FileSaver help panel
- Norton FileSaver balloon help
- Norton FileSaver Guide help



● On
○ Off

untitled ☑
Hard Disk001 ☑

☑ Automatically scan an

Norton FileSaver is set to scan this disk for problems. If you do not want Norton FileSaver to scan the disk, deselect this checkbox.

Norton FileSaver is set to scan this disk for problems.
If you do not want Norton FileSaver to scan the disk, deselect this checkbox.

Hold the cursor over a setting to see a description in a balloon or on the open Help panel

Open or close the Help panels

Do one of the following to see a description of each setting:

- Choose Show Balloons from the Help menu.
- Click the Help triangle on the Norton FileSaver window.

  When you hold your cursor over a setting, its description appears in Norton FileSaver's Help panel.
- Choose Norton FileSaver Help on the Help menu. This opens the Apple Guide help for Norton FileSaver.

Using Hot Keys

You can use keyboard shortcuts to temporarily alter Norton FileSaver's current settings without opening the Norton FileSaver window. These Hot Keys let you do the following:

- Bypass Scan/Update (Option)

  Prevent Norton FileSaver from updating its files now. Use this Hot Key at Shut Down, Eject, or any other preset update time if you don't want Norton FileSaver to update.
- Update Now (Command-Option-U)

  Causes Norton FileSaver to update its disk information files immediately.
- Scan Now (Command-Shift-S)

  Causes Norton FileSaver to scan for problems immediately.
- Bypass Deletion Tracking (Command-Option)

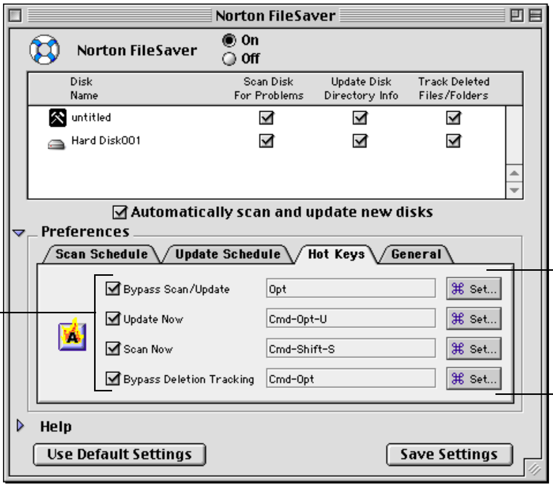
  Tells Norton FileSaver not to track the files you delete.

  Use this Hot Key combination while emptying the Trash. This is useful when you delete a file if you want to prevent Norton FileSaver from tracking its deletion for security reasons. This option will also speed up Trash emptying if you are deleting a large number of files you know you will not want to recover.

By default, all Hot Keys are enabled.

To define a different Hot Keys setting:

1 In the Norton FileSaver window, click the Hot Keys tab.



Norton FileSaver ● On ○ Off

Disk Name	Scan Disk For Problems	Update Disk Directory Info	Track Deleted Files/Folders
untitled	☑	☑	☑
Hard Disk001	☑	☑	☑

☑ Automatically scan and update new disks

☑ Bypass Scan/Update: Opt
☑ Update Now: Cmd-Opt-U
☑ Scan Now: Cmd-Shift-S
☑ Bypass Deletion Tracking: Cmd-Opt

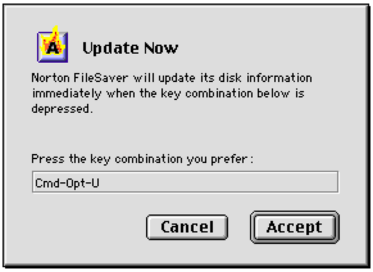
Deselect to disable Hot Keys

Enter a new Hot Key combination

2 To disable a Hot Key combination, deselect the checkbox.

3 Click Set next to the Hot Key you want to change.

The related Hot Key recording dialog box appears.



Update Now

Norton FileSaver will update its disk information immediately when the key combination below is depressed.

Press the key combination you prefer: Cmd-Opt-U

The dialog box describes the Hot Key action.

4 Type the new key combination you want to use:

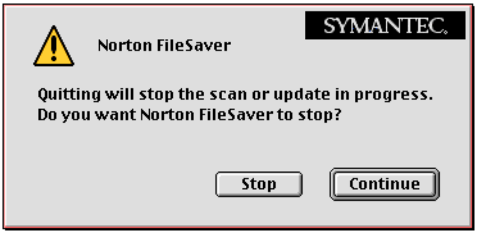
- Press any combination of modifier keys—Shift, Command, Option, Caps Lock, and Control—for Bypass activities.
- Press any combination of modifier keys in combination with another key for update and scan activities.

5 Click Accept to record the new Hot Key combination.

6 Click Save Settings in the Norton FileSaver window.

Responding to Norton FileSaver alerts

Norton FileSaver works in the background to update its directory files and scan your disk for problems. It performs these scans and updates according to the schedule you specify in the Norton FileSaver control panel. If you need to interrupt this scanning process, you may see a message similar to the following:



Quitting will stop the scan or update in progress.
Do you want Norton FileSaver to stop?

To respond to a Norton FileSaver alert:

- To let Norton FileSaver continue its activity, click Continue.
- To halt Norton FileSaver's current activity, click Stop.

  Norton FileSaver will resume according to its Preference settings.

Running Norton Disk Doctor or Speed Disk

Norton FileSaver can alert you when a disk problem is found during a scan and you need to run Norton Disk Doctor, or when your disk fragmentation level indicates that it's time to run Speed Disk.

To run Norton Disk Doctor or Speed Disk from a Norton FileSaver prompt:

1. When a Norton FileSaver alert appears, do one of the following:
   - Click Repair Now to run Norton Disk Doctor.
   - Click Scan Now to run Speed Disk.

   You may be prompted to locate Norton Disk Doctor or Speed Disk.
2. Locate the requested tool, and click Open.

   Norton Disk Doctor or Speed Disk scans your disk.

CHAPTER 7

Wipe Info

Unlike the other Norton Utilities, which protect, rescue, and improve access to your data, Wipe Info destroys data permanently. Use Wipe Info the same way you would use a paper shredder—when you want to be sure that a thrown away file or folder cannot be recovered by any means.

Caution: Be very careful using Wipe Info. There is no way you can recover files that have been erased with Wipe Info. When a file or folder is wiped, it is gone forever.

This chapter explains how to use Wipe Info to:

- Permanently remove unwanted files and folders. See "Wiping a file or folder" on page 141.
- Completely erase a hard disk so that data cannot be recovered. See "Wiping an entire disk" on page 142.
- Completely erase a SCSI or IDE device. See "Wiping an entire device" on page 143.
- Erase unused space on a disk to prevent recovery of erased files. See "Wiping unused disk space" on page 144.
- Use extra wiping security. See "Increasing security" on page 146.
- Create a Wipe Info Trash can. See "Creating a Wipe Info Trash can" on page 147.

When you empty the trash or erase a hard disk, only the bookkeeping information about the disk is modified. The data from erased files remains on the disk—even though the filenames no longer appear in any folder—until the space is needed to store other files. This poses a security risk for sensitive and confidential documents.

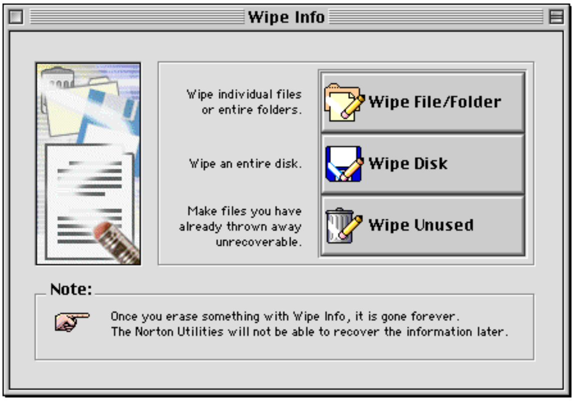
Wipe Info eradicates old data by writing new, meaningless data on top. Not even a Symantec technician will be able to recover anything from your disk that you have wiped.

You can also use Wipe Info to clean the unused space on your disk, to ensure that no sensitive data inside invisible, temporary, or unwanted files are still on your hard disk.

The Wipe Info main window lets you access the three disk wiping operations—Wipe File, Wipe Disk, and Wipe Unused Space. A fourth option, Wipe Entire Device, is available from the Wipe menu. Because you cannot recover wiped data, Wipe Info has built-in safeguards to avoid accidental data loss. You are asked to confirm each operation before data is irretrievably destroyed.

To start Wipe Info:

1 With the Norton Utilities main window open, click the Wipe Info button, or choose Wipe Info from the Utilities menu.



Wipe individual files or entire folders.

Wipe an entire disk.

Make files you have already thrown away unrecoverable.

Once you erase something with Wipe Info, it is gone forever.
The Norton Utilities will not be able to recover the information later.

Click Wipe File/ Folder, Wipe Disk, or Wipe Unused

2 In the Wipe Info window, click one of the following:

- Wipe File/Folder

  Lets you select a file or folder to erase. See “Wiping a file or folder” on page 141.

- Wipe Disk

  Lets you select an entire disk to erase. See “Wiping an entire disk” on page 142.

- Wipe Unused

  Lets you select a disk whose unused space you want to erase. See "Wiping unused disk space" on page 144.

3 To wipe an external device, choose Wipe Entire Device from the Wipe menu.

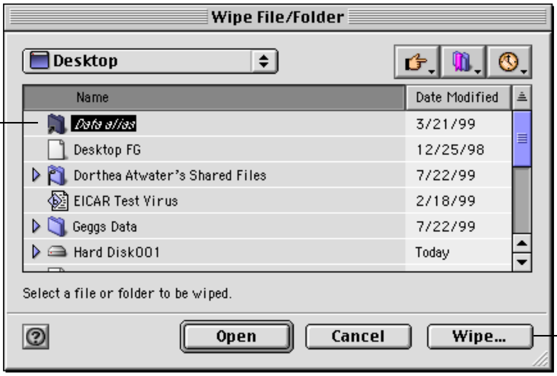
Wiping a file or folder

With Wipe Info you can specify to eradicate either a single file or a folder filled with files. If you must do this regularly, create a Wipe Info Trash can on the desktop so you can destroy unwanted data without having to start Wipe Info each time. See "Creating a Wipe Info Trash can" on page 147 for directions.

Caution: If a folder is wiped, all files and folders inside the selected folder are wiped as well.

To wipe a file or folder:

1 Click Wipe File in the Wipe Info main window.



Name	Date Modified
Data alias	3/21/99
Desktop FG	12/25/98
Dorthea Atwater's Shared Files	7/22/99
EICAR Test Virus	2/18/99
Geggs Data	7/22/99
Hard Disk001	Today

Select a file or folder to be wiped.

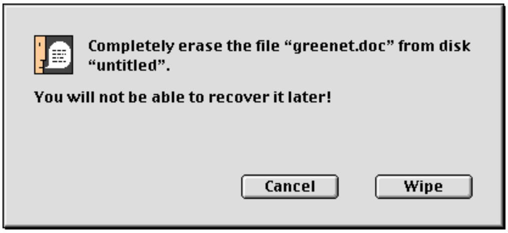
Select the file or folder to wipe

Click to wipe the selected file or folder

2 Locate and select a file or folder to delete.

3 Click Wipe.

You are asked to confirm the deletion.



Completely erase the file "greenet.doc" from disk "untitled".

You will not be able to recover it later!

4 Click Wipe.

Wipe Info erases the selected file or folder permanently.

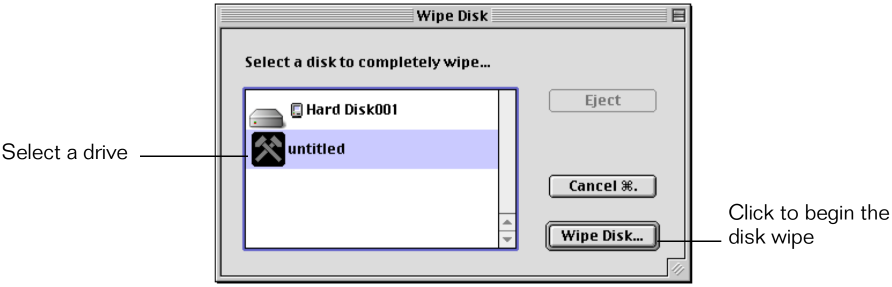
Wiping an entire disk

When you wipe an entire disk, Wipe Info irretrievably eradicates everything on the disk. After you confirm the operation, all data on the the disk is gone permanently.

To wipe a disk completely:

1 Click Wipe Disk in the Wipe Info main window.

A drive selection dialog box appears.



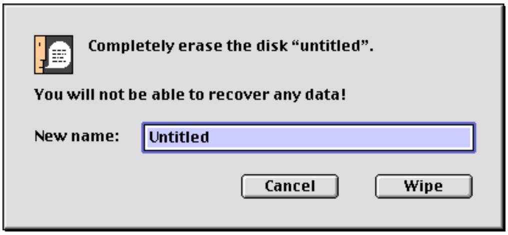
Select a disk to completely wipe…

2 Select a disk drive:

- Click Drive to cycle through all available disks.
- Insert a removable disk to add it to the selection cycle.

3 Click Wipe Disk.

You are asked to enter a new name for the disk and confirm the disk wipe.



Completely erase the disk “untitled”.

You will not be able to recover any data!

New name: Untitled

4 Enter a new name for the disk.

5 Click Wipe.

Wipe Info erases the entire selected disk permanently.

Wiping an entire device

You can wipe any USB, SCSI or IDE device, such as a FireWire, Syquest or Zip drives, internal or external hard disk drives, and so on. If the device is large, the wiping process may require significant time to complete.

Caution: After erasing the device, you will need to reformat it with a compatible formatting software program such as Apple’s Drive Setup, FWB Hard Disk Toolkit or a similar disk tool designed to work with the device make and model.

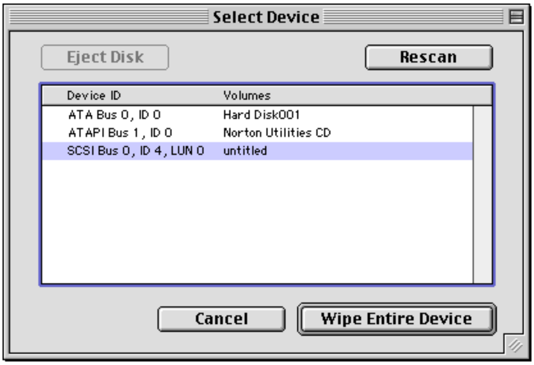
To wipe a device completely:

1 Choose Wipe Entire Device from the Wipe menu.

The Wipe Entire Device window appears with a list of available devices:

- The left column of the window lists all known devices on the selected bus.

- The right column lists the names of all mounted disks.



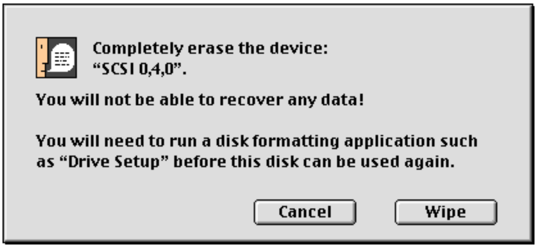
Device ID	Volumes
ATA Bus 0, ID 0	Hard Disk001
ATAPI Bus 1, ID 0	Norton Utilities CD
SCSI Bus 0, ID 4, LUN 0	untitled

2 If the device you want to wipe is not listed, do the following:
   - Re-check all cables and power to devices.
   - Click Rescan to look for other devices.

3 Select a device in the list.

4 Click Wipe Entire Device.

   You are asked to confirm the device wipe.


Completely erase the device:
“SCSI 0,4,0”.

You will not be able to recover any data!

You will need to run a disk formatting application such as “Drive Setup” before this disk can be used again.

5 Click Wipe.

   Wipe Info erases the entire selected device permanently.

Wiping unused disk space

When you wipe the unused space on a disk to prevent recovery of erased files, all files—including files that are in the trash—are untouched. Remember to empty the trash first.

Caution: Wiping unused space on a disk makes it impossible for UnErase to recover erased files.

To wipe unused disk space:

1. Click Wipe Unused Space in the Wipe Info main window to select a disk.

   You can also choose Unused Space from the Wipe menu.

2. Select the device whose unused space you want to delete.
   - Click Drive to cycle through all available disks.
   - Click Eject to eject a floppy disk and insert another.
3. Click Wipe Unused Space in the selection dialog box.

   You are asked to confirm the wipe.

Using UnErase after wiping unused disk space

If you need to use UnErase with FileSaver soon after you have used Wipe Info to wipe unused space, it is possible that UnErase might list filenames of files that you previously deleted, and then were wiped from the unused disk space. These files no longer exist and are not recoverable, but if FileSaver was not turned on when the unused disk space was wiped clean, its file list is not up-to-date.

FileSaver information still lists files for recovery, even though they cannot be recovered.

To remove the names of the non-existent files:

1. Launch Norton Utilities Fast Find.
2. Select the drive on which you wiped Free Space.
3. Type the name “Norton FS Data” (no quotes).
4. Click the “Running Man” find button.
5. When the Norton FS Data file is found, select it.
6. Choose from the File menu “Move...to Trash.”

   The next time you empty the Trash, the Norton FS Data file will be deleted. You can then run Wipe Free Space once more to ensure that the contents of the deleted Norton FS Data file are destroyed.

Increasing security

To meet especially high security requirements, Wipe Info provides a Security Wipe option. With this process, Wipe Info first writes the pattern specified in the Configure Security Wipe window, and then writes a complement of these characters. Finally, Wipe Info writes zeroes over the file space. This Security Wipe process uses DOD-approved methods.

To use Security Wipe:

1 Choose Security Wipe from the Options menu.

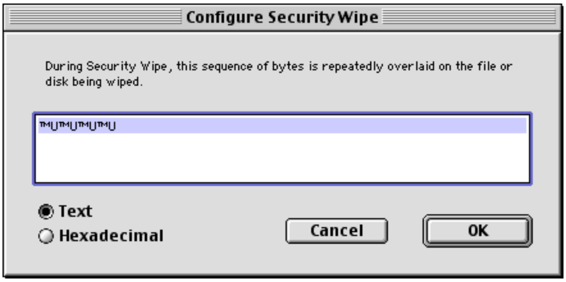
The menu item is selected. To remove security wiping, choose Security Wipe from the Options menu again, so the checkmark is removed.

All future wipe operations use the Security Wipe option until you choose a different option.

To configure Security Wipe:

1 Choose Security Wipe Options from the Options menu.

The Configure Security Wipe dialog box appears.



During Security Wipe, this sequence of bytes is repeatedly overlaid on the file or disk being wiped.

™U™U™U™U

● Text
○ Hexadecimal

2 Select a wipe option:

- Text (Command-T)

  Wipe Info uses patterns of text characters to wipe the disk.

- Hexadecimal (Command-H)

  Wipe Info uses patterns of hexadecimal characters to wipe the disk.

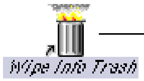
Creating a Wipe Info Trash can

You can create a Wipe Info Trash icon on the desktop to work in conjunction with the regular trash. The Wipe Info Trash lets you destroy unwanted data without having to start Wipe Info each time.

To create a Wipe Info Trash can:

- Choose Create Wipe Info Trash from the Options menu.

  The Wipe Info Trash icon appears in the lower-left corner of the screen.



Drag files or folders here for immediate eradication

To use the Wipe Info Trash:

- Drag a file or folder to the Wipe Info Trash for immediate eradication.
- Drag a disk icon to the Wipe Info Trash to wipe the free space on that disk.
- The Wipe Info Trash behaves differently from the usual trash. If you drag an alias to the Wipe Info Trash, you destroy the file that the alias represents—not the alias.

  If you want to throw away an alias but keep its file or folder, do not use the Wipe Info Trash. Instead, choose Wipe Files and folders from within Wipe Info, and select the alias file to be wiped.

  Alternatively, you can create an empty folder and place the alias to be wiped in that folder. You can then safely wipe the folder containing the alias using Wipe Info Trash, and the original will be unaffected.

CHAPTER 8

Fast Find

As the number of files on your disk increases, finding the one you want can become difficult. Fast Find lets you search local hard disks, floppy disks, and network drives. It can also search in the background while you are using another application.

Use Fast Find to:

- Locate files or folders.
- View documents without opening the application that created them.
- Launch documents and applications.
- View or change a file's technical information.
- Modify a file or folder icon.
- Search for files by their Type or Creator signature.

Tip: Many users rely on Fast Find to avoid clicking through a series of folders to locate a file or application. Use the Make Alias command on the Finder's File menu to create an alias for Fast Find, and put it on the desktop.

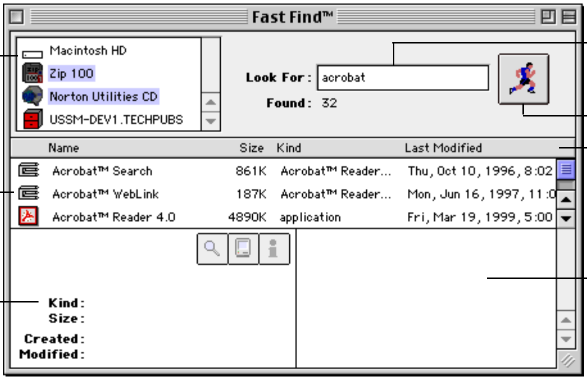
Searching for files and folders

When you install Norton Utilities, a Fast Find alias is added to the Apple menu. You can use this alias without starting Norton Utilities. If Norton Utilities is active, you can also choose Fast Find from the Tools menu.

To start Fast Find:

1 Choose the Fast Find alias from the Apple menu.

The Fast Find window appears.



Look For: acrobat

Found: 32

Name	Size	Kind	Last Modified
Acrobat™ Search	861K	Acrobat™ Reader...	Thu, Oct 10, 1996, 8:02
Acrobat™ WebLink	187K	Acrobat™ Reader...	Mon, Jun 16, 1997, 11:0
Acrobat™ Reader 4.0	4890K	application	Fri, Mar 19, 1999, 5:00

Click the volume to search

Click an item to select it, double-click to open a document or launch an application

View information about the selected item

Enter some text from the file or folder name

Click to start the search

Click a title to sort the list of found files

View path of selected item

The Fast Find window is divided into three parts:

- The top part is where you define your search.
- The middle part lists all found files and folders.
- The bottom part displays the item's details and location.

To find a file or folder:

1 In the Fast Find window, select the volume to search on.

Shift-click to select more than one volume.

2 Type any part of the file or folder name in the Look For field.

The search text can be from any part of the file or folder name and is not case-sensitive.

3 Click the running man icon.

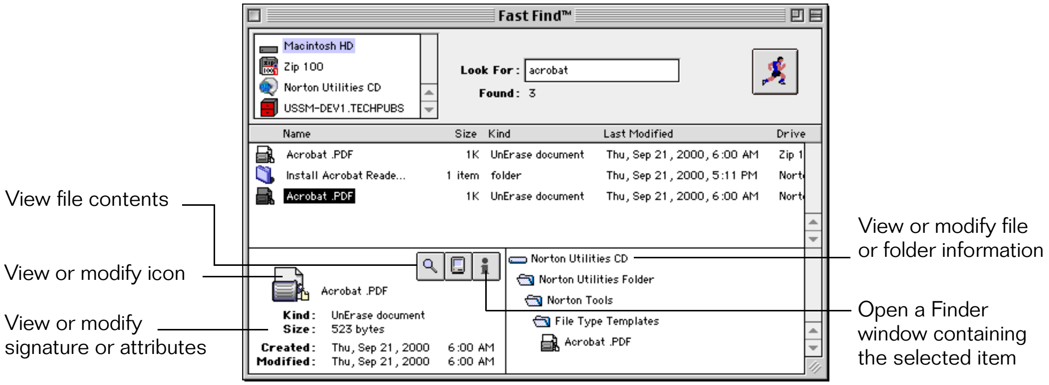
To halt the search, click Stop.

All matching file and folder names appear in the list of found files.

If no matches are found, Fast Find just beeps.

4 To view information about a found file, click its name.

The item's location appears in the lower-right panel, and information about the item appears in the lower-left panel.



Look For: acrobat

Found: 3

Name	Size	Kind	Last Modified	Drive
Acrobat .PDF	1K	UnErase document	Thu, Sep 21, 2000, 6:00 AM	Zip 1
Install Acrobat Reade...	1 item	folder	Thu, Sep 21, 2000, 5:11 PM	Nort
Acrobat .PDF	1K	UnErase document	Thu, Sep 21, 2000, 6:00 AM	Nort

Acrobat .PDF

Kind: UnErase document
Size: 523 bytes
Created: Thu, Sep 21, 2000 6:00 AM
Modified: Thu, Sep 21, 2000 6:00 AM

Norton Utilities CD
Norton Utilities Folder
Norton Tools
File Type Templates
Acrobat .PDF

View file contents

View or modify icon

View or modify signature or attributes

View or modify file or folder information

Open a Finder window containing the selected item

5 If you have too many matches, add a few more characters to the partial name in the Look For text box, and start the search again.

Note: If Fast Find cannot locate a file, try using UnErase in case it was accidentally thrown away, or is not visible. UnErase can also search your entire disk for text within the file. See "Recovering erased or missing data" on page 76 for more information.

Working with found files and folders

After a search is completed, Fast Find has several flexible capabilities to manage files and folders. All operations begin by selecting an item in the list of found files.

To select a found file or folder:

- Click a name in the list of found files.

  The location of the selected file or folder appears in the lower-right panel of the Fast Find window.

To select multiple items:

- Shift-click found items in the list of found files.

  For multiple selections, location information is not shown.

To get information about the selected file or folder:

- Select an item and click the Info icon in the lower-left panel of the Fast Find window.

  An information dialog box appears. Click Cancel to close the information dialog box.

To sort the found files:

- Click the Name, Size, Kind, Last Modified, or Drive column title in the list of found files.

  The list appears in the chosen order.

Note: The underscored column title indicates the current sort key.

To move a file or folder to the desktop or the Trash:

1. Select one or more items.
2. Choose Move from the File menu, and then choose To Trash or To Desktop.

Tip: Items moved to the desktop or to the Trash can be returned to their folders with the Put Away command, found on the File menu when the Finder is active.

To open a document or launch an application:

- Select the item and press Command-O on the keyboard, or double-click the file name in the list of found files.

  The selected application is launched, or the selected document is opened if the application that created it is found.

  A beep indicates that an application could not be launched, for example, if a document's creating application is no longer on the disk, or if there is not enough memory to launch the application.

To show the file or folder in a Finder window on the desktop:

- Select an item in the list of found files and press Command-S on the keyboard, or click the computer icon in the lower-left panel of the Fast Find window.

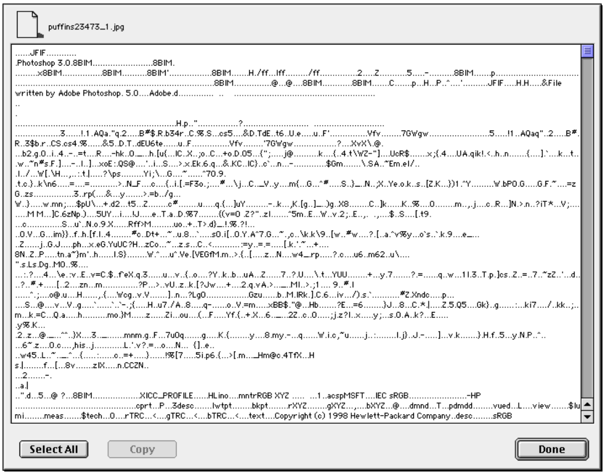
  The folder containing the selected file appears in a Finder window.

To view the file contents:

1 Select an item.

2 Click the magnifying glass in the lower-left panel of the Fast Find window.

The file's contents appear in a scrolling list box.



Although viewing a file with Fast Find is not the same as viewing it in its native application (and you only see the first 32K of the file), it's a quick way to verify the contents of some data files.

3 To copy text, select text from the file, copy it to the Clipboard, and then paste the contents into another text file, such as SimpleText or a word processing application.

To locate the application that created a found file:

- To locate the application that created a selected file, hold down the Control key and click the filename in the list of found files.

  The lower-right panel of the Fast Find window changes to show the location of the application rather than the file.

To print a file:

1 Select a file in the list of found files.

2 Choose Print from the File menu.

The print dialog box for the application that created the file appears.

3 Click OK.

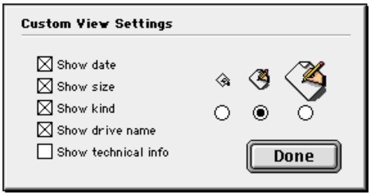
Customizing the found files display

If you do not need to see all of the information listed about each entry, want to use a different-sized icon in the list of found files, or want to see technical information (data and resource fork sizes, Type, and Creator), you can customize the list.

To customize the display of found files and folders:

1. Choose Customize from the View menu.

   The Custom View Settings dialog box appears.



Custom View Settings

☒ Show date
☒ Show size
☒ Show kind
☒ Show drive name
☐ Show technical info

○ ● ○

2. Select the settings you want displayed as columns in the list of found files:

   - Show Date

     Day, date, and time the file was last modified.

   - Show Size

     File size in kilobytes (KB).

   - Show Kind

     Name of the item's Type or its Creator application (for example, folder, SimpleText document, and so on).

   - Show Drive Name

     Name of the drive on which the item is located.

   - Show Technical Info

     Resource, Type and Creator codes for the item.

3. Select a display icon size.
4. Click Done.

   The list of found files displays your new settings.

Viewing Info, Settings, or Icons

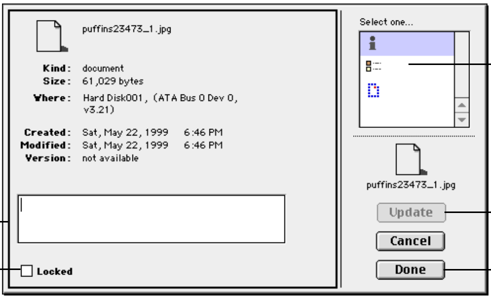
With Fast Find, you can review or change stored information about a file or folder. You can view or modify the Finder comment, lock or unlock it, change its signature codes (Type and Creator) and attributes, or edit its icon.

Note: To examine or modify a file or folder in Fast Find, you can bypass the search to place it in the list of found files. In the Finder, drag any file or folder icon onto the Fast Find icon. The item appears in the Fast Find window.

To get information about the selected file or folder:

1. Select a file or folder in the Fast Find list of found files.
2. Click the Info icon in the lower-left panel of the Fast Find window.
3. Select General, Settings, or Icon from the list box in the upper-right corner of the Information dialog box.
   - General

     This information is the same as that provided by the Finder Get Info command. You can enter or modify the file's comment or select Locked to lock the file or folder. You cannot change the comment if Locked is selected.



puffins23473_1.jpg

Kind: document
Size: 61,029 bytes
Where: Hard Disk001, (ATA Bus 0 Dev 0, v3.21)

Created: Sat, May 22, 1999 6:46 PM
Modified: Sat, May 22, 1999 6:46 PM
Version: not available

Select General, Settings, or Icon

Type a comment

Click to save changes

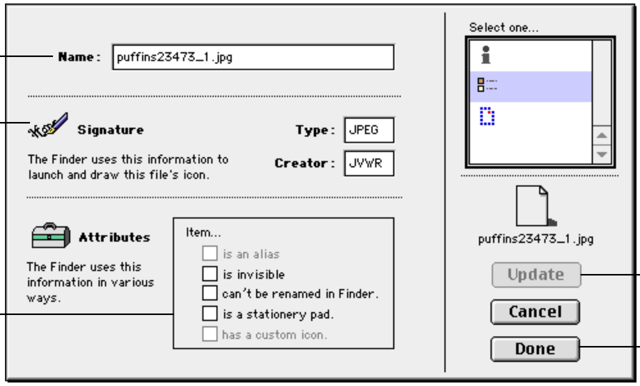
Click to lock a file or folder

Click to return to main window

   - Settings

     Files, not folders, have a Type and Creator signature. If you change a file's signature, the file may not load or launch. Do not make changes unless you know what you are doing!

A quick way to access this dialog box is to double-click anywhere in a file's info summary in the lower-left panel of the Fast Find main window.



Change the file or folder name

Modify the signature

Select or deselect attributes

Click to save changes

Click to return to main window

Name: puffins23473_1.jpg

Signature

The Finder uses this information to launch and draw this file's icon.

Type: JPEG

Creator: JVWR

Attributes

The Finder uses this information in various ways.

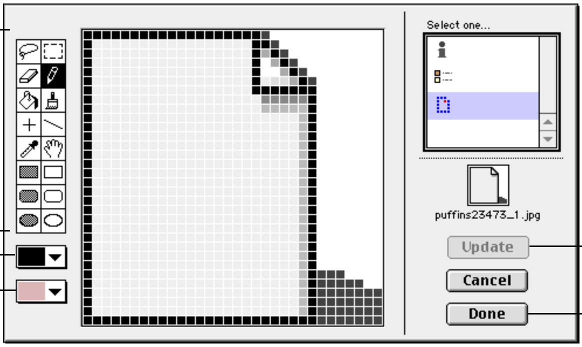
Item...

- ☐ is an alias
- ☐ is invisible
- ☐ can't be renamed in Finder.
- ☐ is a stationery pad.
- ☐ has a custom icon.

- Icon

  This option lets you personalize a file or folder's icon using paint tools, pattern palettes, and color palettes. After you make changes, you will have to restart your computer to see your handiwork in action.

  A quick way to access this dialog box is to double-click the file or folder's icon in the lower-left panel of the Fast Find main window.



Use the paint tools to modify the icon

Choose patterns

Choose colors

Click to save changes

Click to return to main window

The display changes according to your selection.

Note: If you make changes and click Update, Cancel does not undo the changes.

Finding files by kind

Fast Find can locate files by their Type and Creator, or signature. For example, you might want to find all aliases or all AppleScript files on your disk.

You can refine a search by combining text in the Look For field with the selection of a file kind. For example, entering “John” in the Look For field and then choosing “AppleScript files” in the Find By Kind dialog box, results in matches only for AppleScript files that contain “John” in their filenames.

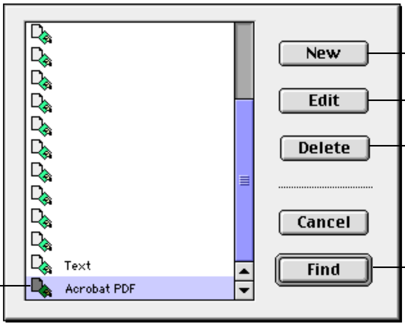
The default list in the Find by Kind dialog box contains several common file types. You can add others to the list.

To locate files by kind:

1. Choose Find By Kind from the Find menu.

   If there is no text in the Look For field, Fast Find searches for all files of the kind you specify.

   The Find By Kind dialog box appears.



Click to add a new search kind

Click to modify the selected kind

Click to remove the selected kind from the list

Click to begin the search

Select the search kind from the list

2. Select a file type from the list and click Find.

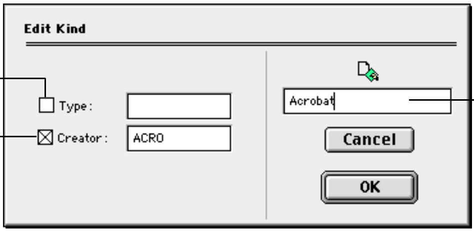
   Fast Find displays all files that match the kind you selected.

To add items to the Find by Kind list:

1. Click New to add a signature search to the list.
2. Select Type, Creator, or Both in the Edit Kind dialog box.
3. Enter the signature codes.

   The match for signature codes is case-sensitive.

4 Enter the name in the text box that you want to appear in the Find By Kind list box.



☐ Type:

☒ Creator: ACRO

Acrobat

Select and enter the Type code

Select and enter the Creator code

Enter the name that will appear in the list

5 Click OK.

To modify an item in the list:

1 Select the item.

2 Click Edit to modify an existing signature search.

3 Make the changes in the Edit Kind dialog box.

4 Click OK.

To delete an item in the list:

1 Select the item.

2 Click Delete.

Locating an unavailable application's files

You can locate all documents created by a particular application on your disk, even if the application does not appear in the Find By Kind list. Use Fast Find's Type and Creator options to search.

To locate files created by an unavailable application:

1 Use Fast Find to locate any document created by the application.

2 Select the found item in the list.

3 Click the Info icon.

4 Choose Settings.

5 Note the Type and Creator information in the signature group.

6 Follow the procedure, "To add items to the Find by Kind list:" on page 157.

In most cases, the Creator signature is sufficient to locate your documents.

CHAPTER 9

DiskLight

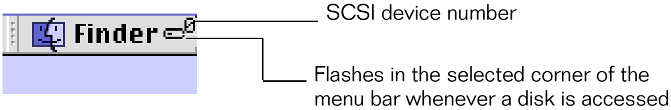
Use DiskLight to keep informed of disk read and write activity. A normally functioning hard disk is a good indicator that the rest of your system is functioning normally.

Although some disk drives have external indicator lights that indicate activity, you may not be able to see the light if your computer is under your desk or in another location. You may not want to take your eyes away from the screen to view the disk activity. PowerBook drives are hard to hear and do not have a drive light.

Use DiskLight to:

- Monitor drive and other device activity.
- Verify that applications are working and have not crashed during long periods when they may be working with data on a disk.

Normally, DiskLight flashes when you open a disk, folder, file, or document, that is, when your Macintosh is reading data off the disk. The icon changes to let you know if it is a hard or floppy disk, or a disk read or write operation.


Finder
0
SCSI device number
Flashes in the selected corner of the menu bar whenever a disk is accessed

For SCSI devices, DiskLight can display the device ID number to the right of the flashing icon. In most cases, device 0 is your primary hard disk. For other device types, such as IDE hard disks, only the disk icon appears.

When you save a document, DiskLight flashes to tell you it is writing to the disk. If DiskLight does not flash when you expect it to, run Norton Disk Doctor because there may be a problem with your disk. Disk activity that is not patterned or rhythmic is a good sign that all is well.

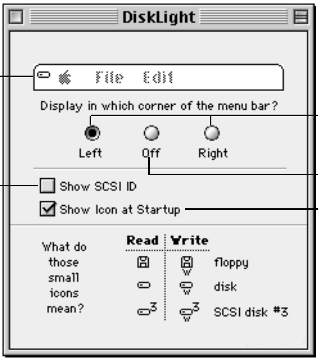
Configuring DiskLight

Use the DiskLight control panel to enable or disable DiskLight. You do not have to restart your computer for your settings to take effect.

To configure DiskLight:

1. Choose Control Panels from the Apple menu.
2. Double-click DiskLight.
3. Click the Left or Right option button to turn DiskLight on.

   Select Off to turn DiskLight off.
4. Select Show SCSI ID to see the SCSI device number accessed when the DiskLight icon flashes.
5. Select Show Icon at Startup to be reminded that DiskLight is loading at startup.



Display in which corner of the menu bar?

● Left ○ Off ○ Right

☐ Show SCSI ID

☑ Show Icon at Startup

Icon flashes in the selected corner of the menu bar

Select to show SCSI ID numbers when DiskLight flashes

Enable or disable DiskLight

Disable DiskLight

Select to be reminded that DiskLight is installed at startup

Note: To prevent DiskLight from loading at startup, hold down the Option key during startup. If Show Icon at Startup is selected, the DiskLight icon appears with an "X" over it.

CHAPTER 10

System Info

System Info runs a series of tests to measure your computer's performance against that of other Macintosh computers. This chapter explains how to use System Info to:

- Test the performance of your system.
- Generate a report of your current system configuration.
- Compare the speed of your system to other Macintosh computers.
- Test a Power Macintosh to compare native versus emulated performance.

You can also generate a system configuration report, including a machine overview, the video type, disk information, and installed system extensions. For more information, see "Viewing the system configuration" on page 165.

System Info runs four separate test suites: CPU (Central Processing Unit), Video, Disk, and FPU (Floating Point Unit). The results from these test suites are combined to generate a single System Rating.

You can run all suites with one command, each of the four suites separately, or any test from a suite individually. See "About the System Info tests" on page 169, for technical information on the tests.

Running System Info tests

Use System Info tests to measure your system's performance and to compare it to other Macintosh computers. For most users, the CPU ratings are the most important. The System Rating gives you a general idea of overall performance. In some work situations this rating is less important than the individual suite ratings. For example, Disk ratings are usually more important than Video ratings when using large databases. Video ratings are generally more important than FPU ratings for a graphic artist or multimedia users.

Refer to the system configuration report, which lists hardware components, configuration options, disk information, and installed system extensions, to get an overview of your system setup.

Note: When comparing System Info results for your computer to a benchmark for the same model included with the Norton Utilities, remember that any differences in performance may be due to differences in configuration, and do not necessarily indicate a problem with your computer. More useful results can be obtained by comparing your system with itself under varying configurations.

If you ever feel that your system is slowing down or overall performance is degrading, but you cannot isolate any particular problem, run System Info again and compare the results. By comparing your current system to previously saved ones, you can find out what, if anything, has changed. See “Viewing the system configuration” on page 165 for directions to view the report.

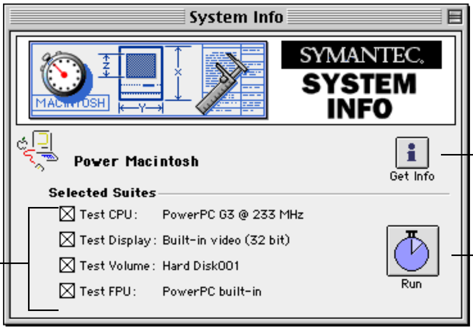
When System Info tests a computer, it can report results in two levels of detail. The basic level provides graphical comparisons for the overall system rating and each of the four test suites. The advanced level lets you view graphical comparisons of each component test, as well as the numbers behind the graphs.

Note: You may notice that other testing programs generate different component results. Because System Info emphasizes real-world, time-based ratings in its benchmarks, it more accurately measures how well your computer performs on the job.

To run System Info:

1. From the Norton Utilities main window, click System Info.

   The System Info window appears.



Power Macintosh

Selected Suites

☒ Test CPU: PowerPC G3 @ 233 MHz
☒ Test Display: Built-in video (32 bit)
☒ Test Volume: Hard Disk001
☒ Test FPU: PowerPC built-in

Select each test suite you want to run

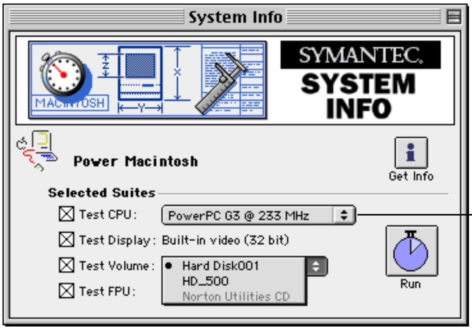
Click to display a summary of the selected system

Click to start tests

   Some systems can be tested in different configurations. For example, you may have more than one hard disk, or you may have a color and a monochrome monitor connected.

2. To select different test suites, choose Show More Choices from the Benchmarks menu.

   The available options display pop-up lists of more choices.



Power Macintosh

Selected Suites

☒ Test CPU: PowerPC G3 @ 233 MHz
☒ Test Display: Built-in video (32 bit)
☒ Test Volume: ● Hard Disk001
HD_500
Norton Utilities CD
☒ Test FPU:

More configurations are listed when available on your system

   To return to the basic level, choose Show Fewer Choices from the Benchmarks menu.

3. Select the test suites you want to run in the System Info main window.
4. Select the configuration you want to test from the lists in the System Info main window.

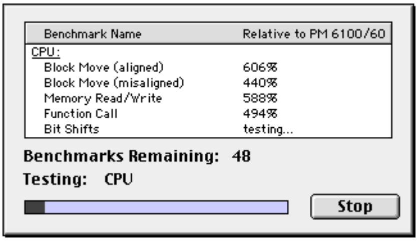
   Some systems have only one option for some (or all) of the suites. Your system must support an option before it appears. For example, you must be running on a Power PC to support Power PC and Emulated 68020 as other configuration options. The multiple hard drive option is only available if more than one hard drive is available.

Note: Do not move the mouse or type on the keyboard while running benchmarks. Doing so can affect test results.

---

5 Click Run.

System Info runs the test and displays its progress in a window.



Benchmark Name	Relative to PM 6100/60
CPU:	
Block Move (aligned)	606%
Block Move (misaligned)	440%
Memory Read/Write	588%
Function Call	494%
Bit Shifts	testing...

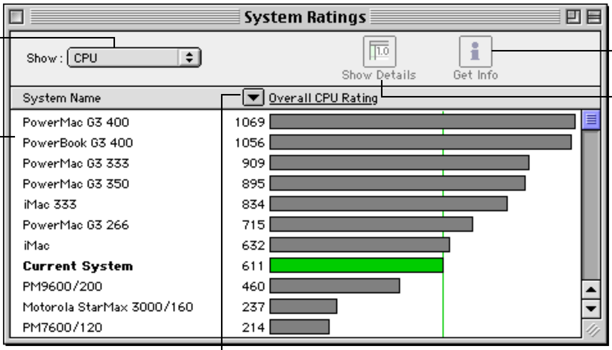
Benchmarks Remaining: 48

Testing: CPU

A Power Macintosh can be run in native mode or emulated 68020 mode. When you choose to test an emulated CPU on a Power Macintosh, all suites are run in emulated mode, not just the CPU tests.

To run tests in native mode, you must have the Power PC native version of System Info installed. The default installation on a Power Macintosh computer installs the correct version.

When System Info completes the tests, the System Ratings window appears comparing the system to other popular models.



System Name	Overall CPU Rating
PowerMac G3 400	1069
PowerBook G3 400	1056
PowerMac G3 333	909
PowerMac G3 350	895
iMac 333	834
PowerMac G3 266	715
iMac	632
Current System	611
PM9600/200	460
Motorola StarMax 3000/160	237
PM7600/120	214

Select a test suite

Select a system to compare

View a hardware summary of the selected system (or double-click a system)

Open the Detailed Results window

Select a specific test from the selected suite

To view an overall suite rating:

- Choose CPU, Video, Disk, or FPU from the Show list.

To change the order of the listing:

- Click the title of a results column, such as System Name or System Rating or choose a sort column from the View menu.

  For System Name, the order is alphabetical. For a ratings column, the order is descending performance.

  Tip: To sort in reverse order, hold down the Option key while choosing a sort column.

To save test results for future review:

- Choose Save Current System As from the File menu.

To review existing results without running the tests:

- Choose Show System Ratings from the Benchmarks menu.

To run a specific test:

1. Choose a test suite from the Benchmarks menu.
2. Choose the specific test from the submenu.

To view specific test results:

1. Select a suite from the Show list.
2. Click the Rating button (over the ratings column) to choose a specific test.

Tip: Test your system's performance with and without Extensions and Control Panels loaded. Some Extensions, particularly on Power Macintosh computers, can slow down video performance substantially. To prevent Extensions and Control Panels from loading, hold down the Shift key while restarting your computer.

Viewing the system configuration

In the System Ratings window, you can view a detailed report of the current system or another selected computer system. Items included in this report include the test parameters, a machine overview, the video type, volume information, and installed system extensions.

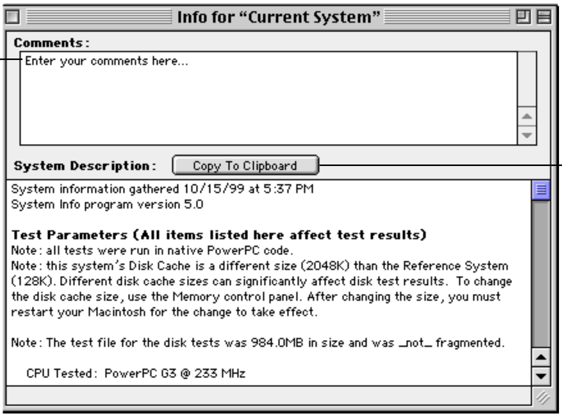
To view a system configuration:

1 Select a system in the System Ratings window.

2 Do one of the following:

- Click Get Info.
- Double-click the system in the System Ratings window.

  The Info window appears with a description of the system you selected.



```
System information gathered 10/15/99 at 5:37 PM
System Info program version 5.0

Test Parameters (All items listed here affect test results)
Note: all tests were run in native PowerPC code.
Note: this system’s Disk Cache is a different size (2048K) than the Reference System
(128K). Different disk cache sizes can significantly affect disk test results.  To change
the disk cache size, use the Memory control panel. After changing the size, you must
restart your Macintosh for the change to take effect.

Note: The test file for the disk tests was 984.0MB in size and was _not_ fragmented.

   CPU Tested:  PowerPC G3 @ 233 MHz
```

Enter comments about the current system

Click to copy the summary to the Clipboard

If you are viewing a benchmark system, you cannot enter comments. However, if you are viewing the current system, you can enter comments in this report. For example, you might want to record the presence of a cache card or accelerator card in your current system. Once you save the current system results, you cannot change the comments.

3 Enter a comment in the Comments text box, if available.

4 To save, choose Save Current System As from the File menu.

Note: To see the standard test parameters, select Reference System in the System Ratings window and click Get Info. To make valid comparisons of your system to other systems, make sure the test parameters are the same for all systems.

Selecting systems for comparison

Test results for each system are stored in a folder named Benchmark Results. By default, all system results stored in this folder are displayed in the System Rating window. You may want to restrict the displayed list to particular systems. However, you cannot remove the Current System or the reference system.

To remove systems from the results list:

1. Select the system you want to remove.

   Shift-click for multiple selections.

2. Choose Remove System From List from the Edit menu.

   The selected system ratings are moved to the Hidden Results folder inside the Benchmark Results folder and no longer appear in the System Ratings window.

To add existing system ratings to the results list:

1. Choose Add Systems to List from the Edit menu.

   A file selection dialog appears.

2. Select a system and click Show.

   Repeat for all systems you want to add.

3. Click Done.

   The System Results window includes the additional systems.

Examining the data behind the graphs

You can examine the test result values that are used to generate the graphs. The Detailed Ratings window displays individual test results in a tabular form for easy comparison of tests within a suite. By default, the Detailed Ratings window displays all results relative to the reference system. You can change the relative system or view absolute results.

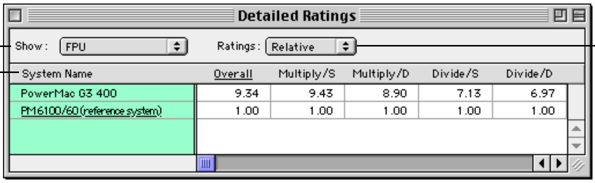
To view detailed results:

1. Select the systems for which you want to view data in the System Ratings window.

   Shift-click to select multiple systems. Choosing systems is helpful in comparing only systems of interest.

2 Click Show Details.

The reference system and other selected systems appear in the Detailed Ratings window.



Show: FPU

Ratings: Relative

System Name	Overall	Multiply/S	Multiply/D	Divide/S	Divide/D
PowerMac G3 400	9.34	9.43	8.90	7.13	6.97
PM6100/60 (reference system)	1.00	1.00	1.00	1.00	1.00

Select System Rating or a particular test suite in the Show list

Click a title to change the sort order

Select a rating after you select System Ratings in the Show list

3 Select a test suite or System Rating from the Show list.

If you select System Rating, select a rating from the Ratings list:

- Absolute

  Displays actual results.

- Relative

  Compares test results against the system you select. Test results are set to 1.0 for all tests for that system, and the unweighted values behind the graphs are displayed.

Note: You can sort the Detailed Ratings window by clicking any column title or choosing a sort column from the View menu. However, adding or removing systems from the list must be performed from the Benchmark Results window.

By default, all systems are compared to a Power Macintosh 6100/60. When the weights for each test are computed, in actual results per second, the overall System Rating for the reference system is set to equal 100. When the Ratings setting is set to Relative, clicking any system makes it the reference system, with all its test results set arbitrarily to 1.0 in the Detailed Ratings window. All other systems in the list are recalculated relative to the selected system.

To view absolute results in Detailed Ratings window:

- Select Absolute in the Ratings list.

To change the relative reference system in Detailed Ratings window:

1 Select Relative in the Ratings list.

The first time you select Relative, you are reminded to click the desired system in the System Name column.

2 Click the system you want in the System Name column.

The ratings table is recalculated to display values relative to the selected system.

About the System Info tests

Most benchmarks were chosen to measure specific types of Macintosh system performance. A few benchmarks implement a real-world programming problem to exercise processor features in a way similar to a real application.

Variations in test results of up to 1 percent are normal. For disk tests, variations of up to 7 percent are normal due to disk drive operation.

CPU benchmarks

The CPU benchmark test measures the performance of the microprocessor, or Central Processing Unit. Because the CPU is responsible for the bulk of computing tasks, you may find it is the most important. For meaningful results, factors such as the system bus, memory speed, and caching (if any) are incorporated into the tests.

Some CPU tests actually test more than the CPU itself. For example, some tests access memory (RAM), which tests not only the CPU, but the system bus, memory speed, and caching (if any). These factors can influence test results substantially. For the purposes of benchmarking, these factors are all considered to be part of the CPU.

Note: System Info does not detect cache cards or L2 cache cards, which can substantially improve performance. If you run tests with a cache card installed on your computer, note its presence in the Comments area of the Info For Current System window to make it clear the test results were run with a cache card installed. Similarly, note the presence of third-party accelerators. See “Viewing the system configuration” on page 165 for directions on entering comments.

CPU benchmark settings

BlockMove Aligned and BlockMove Misaligned

Measures the rate at which the Macintosh can move memory using the ROM trap BlockMove. On all Macintosh computers, BlockMove is highly optimized and is a good measure of memory bandwidth (how much data can be moved per unit time). An aligned and misaligned case are used because, on some Macintosh computers, performance is much poorer when data is not aligned properly. Newer models, such as Power Macintosh computers, have excellent performance in both cases.

Memory Read And Write

This is also a memory bandwidth test, but the benchmark accesses memory in the way a program normally would and does not make use of any special machine instructions.

Function Call

Measures the overhead associated with making a series of function calls with arguments. Most application programs make large numbers of function calls.

Bit Shifts

Measures how fast bits can be shifted. This type of instruction is used frequently by a wide variety of software.

Multiply And Divide

Measures speed of integer multiplication and division. The tests emphasize multiplication. Application programs frequently use this type of instruction to access arrays.

Branches

Measures how fast code containing conditional branches can run. Branches are one of the most common types of instructions used and can substantially affect performance on some CPUs. Power Macintosh computers have a special processing unit dedicated to processing branch instructions.

Instruction Overlap

Measures the ability of the CPU to execute integer (not floating point) instructions at the same time it accesses memory. The benchmark is written in such a way that memory access should be able to execute at the same time all intervening computations are performed.

Sort

A high-level benchmark that sorts a large array using a quick-sort and insertion-sort hybrid algorithm that makes heavy demands on memory and looping constructs.

Tree

A high-level benchmark that builds a large, sorted binary tree by repeated insertion. Good caching and memory bandwidth can speed up this test considerably.

Search

A high-level benchmark that performs a sophisticated string-searching algorithm that makes extremely heavy demands on memory in a partially sequential way. This test is designed to access memory in a way that most machines cannot cache effectively without a substantial amount of cache memory.

Video benchmarks

The Video benchmarks measure the speed of frequently used video operations such as scrolling, drawing text, and moving images around on the screen. Specifically, they test the speed at which common QuickDraw operations can be performed.

You could use the Video tests to speed up screen drawing at different video settings. For example, if you only use a word processor most of the time, try reducing the bit depth for colors (number of colors and grays) to speed up screen drawing, then compare the Video ratings. On some systems, reducing the bit depth of the built-in video display can increase overall system performance on all types of computations, not just screen drawing.

Monitor resolution also significantly affects this test. Video will be faster with a resolution of 640 x 580 than at a higher setting such as 1024 x 768.

To change the number of colors or monitor resolution:

1. Choose Control Panels from the Apple menu.
2. Open the Monitors or Monitors and Sound control panel.
3. Select the Monitors option.
4. In the Color Depth group, choose Grays or Colors, then select a setting, such as 256, Thousands, or Millions.
5. In the Resolution group, select a resolution.

   Your changes take effect immediately.

Video Benchmark Settings

The benchmarks are designed to measure frequently used operations, not esoteric transfer modes or rarely utilized QuickDraw routines. For example, scrolling operations are emphasized in the overall video rating because they are heavily used by all users. Note that as the video bit depth is reduced, video performance generally increases. If you compare video performance on two different systems, make sure to test at the same video bit depth.

Rectangles, Round Rectangles, and Ovals

These tests cycle through painting, erasing, filling, framing, and inverting the respective shapes with different fill patterns and colors, where appropriate.

Lines

Draws lines of varying slopes and colors. The video circuitry of some Macintosh computers is highly optimized for drawing lines.

Draw Picture

Draws a bitmapped picture at the same bit depth of the screen. It tests the ability of QuickDraw to decode a PICT format picture and place its bits on the screen.

CopyBits (Small, aligned; small, misaligned; large, aligned, large, misaligned)

Measures how fast bits can be moved around on the screen using the CopyBits ROM routine, which is heavily used in screen drawing. The small cases are 32 by 32 pixels (the size of a large icon). The small cases are significantly impacted by the overhead of calling QuickDraw and its setup.

The large cases minimize this overhead, and more accurately test the speed at which bits can be moved. Aligned (to a 32-pixel boundary) and misaligned cases test optimal and non-optimal situations.

DrawText

Measures how fast a sentence can be drawn on the screen. Primary emphasis is placed on drawing plain text, although bold and italic text are tested as well.

Scrolling

Measures how fast bits can be scrolled on the screen. Emphasis is placed on vertical scrolling, but some horizontal scrolling is also performed. Results of this test vary widely depending on the bit depth of the screen.

Disk benchmarks

The Disk test measures how fast the computer reads or writes data to and from a disk. The disk benchmarks are not pure disk tests because they test not just the disk, but also the overhead involved in making system calls to the Macintosh ROM.

Use the Disk tests to find out how much you can benefit by purchasing a faster drive. Most Macintosh computers are capable of far better disk performance than is obtained from a factory-installed disk drive. System Info includes test results showing systems with a very fast hard disk so you can get an idea of what disk performance is possible on your Macintosh.

The built-in disk cache can dramatically affect the results of all disk tests. When comparing different disks, use the same size disk cache (the System Info standard test size is 128K).

However, for best performance under System 7.5 or later, it is recommended that you allot 32K of disk cache for each megabyte of physical RAM up to 64 MB. Setting a disk cache larger than 2 MB will usually not noticeably improve performance. Be sure to set the disk cache back to its optimum value after running System Info.

To change the disk cache size:

1. Choose Control Panels from the Apple menu.
2. Open the Memory control panel.

3. Enter a new value for Disk Cache.
4. Restart your computer.

   Changes do not take effect until you restart your computer.

A hard disk must have at least 2 MB of free space to run any test in the Disk suite (floppy disks require 0.5 MB). Network volumes, RAM disks, optical disks, and even floppy disks can be tested. Any disk tested must be writeable; CDs or locked disks cannot be tested. The tests are non-destructive and use only the free space on the drive.

Note: Because the Disk tests involve writing to disk, you will not be able to recover erased files with UnErase. If you want to recover erased files, use UnErase before running the Disk tests.

For the same reason, do not run tests on damaged volumes that may require repairs. It is recommended that you examine drives with Norton Disk Doctor prior to benchmarking with System Info.

Disk benchmark settings

By design, the disk tests do not isolate disk speed alone. The benchmarks include factors that applications normally experience, such as CPU speed, SCSI bus speed, impact of the disk cache, and fragmentation.

Random Read, Random Write

These benchmarks read or write data into a file in three 1 MB bands. The data size read and written varies from 4 bytes to 4 kilobytes. These tests reflect seek time, the effects of the disk cache, and how fast a drive can process numerous small requests to read or write data. They are a good indicator of overall disk performance.

All Read and All Write

These benchmarks read or write data into a file in three 1 MB bands. The data size read and written varies from 4 bytes to 4 kilobytes. These tests reflect seek time, the effects of the disk cache, and how fast a drive can process numerous small requests to read or write data. They are a good indicator of overall disk performance.

Sequential Read, Sequential Write (1K, 4K, 16K, 64K, and 256K)

Measure how fast the drive can read and write data when requested in a specific size chunk. Some drives can transfer data efficiently only in large chunks. Others are efficient with many small chunks, but slow down with large chunks. These sequential tests intentionally bypass the built-in disk cache (to eliminate cache overhead) and provide a better indicator of performance of the disk itself.

FPU benchmarks

The FPU tests measure the performance of floating point (mathematical) calculations. These types of calculations are used mostly in spreadsheets, scientific applications, and design programs. To assist technical users who are often concerned with only the speed of certain calculations, a wide range of benchmarks is used. Both single precision and double precision operations are tested, as the speed difference is significant on some machines. Not all Macintosh computers have hardware FPUs; some perform the calculations through software.

Note: FPU speed is given very little weight in the overall System Rating because the FPU is not used by everyone. If you are concerned with FPU speed, look at the FPU ratings separately.

All FPU tests are directly comparable among themselves. For example, you can directly compare the speed of a multiply to an addition, square root, or cosine.

A single-precision floating-point number is 32 bits. Because of differences in the floating point formats supported on various machines, a double-precision number varies in size. For double precision, the fastest format available that is at least 64 bits in size is used.

FPU benchmark settings

Multiply, Divide, Add, And Subtract

Measure basic FPU performance in both single and double precision. On some machines, double precision may actually be faster than single precision because single precision numbers must first be converted to double precision before the calculation occurs.

Integer To Single And Single To Integer

Convert an integral number to a single precision floating point number and vice versa. Some machines have hardware instructions for both operations, some have neither, and some have just one. This accounts for dramatically different results that you may encounter, depending on which way the conversion goes.

Sine, Cosine, Tangent, And Arc Tangent

Measure trigonometric performance on double-precision numbers. These results can vary dramatically from computer to computer.

Absolute Value, Square Root, And Log 10

Measure the absolute value, square root, and logarithm in base 10, respectively, of a double-precision number.

Vector

Measure how fast an array of numbers (vector) can be manipulated. Each element in the array is multiplied by a constant; a constant is added, and the result is stored back into the array (X' = aX + B).

Using System Info reports

System Info generates a system configuration report, in addition to its system ratings. The report, which lists hardware components, configuration options, disk information, and installed system extensions, gives you an overview of your system setup. If you ever feel that your system is slowing down or overall performance is degrading, and you have run Norton Disk Doctor and Speed Disk, run System Info again and compare the report results. By comparing your current system configuration to that in a previously saved report, you can find out what, if anything, has changed.

CHAPTER

11

Keeping Norton Utilities files current

This chapter explains how to use LiveUpdate to keep the Norton Utilities program updated. If you have an Internet connection, LiveUpdate is the most efficient method to update program files.

About LiveUpdate

Symantec provides online access to updated program files with your subscription. Using your existing Internet connection, LiveUpdate connects to the Symantec's Web site, checks for available program updates, then downloads and installs them automatically.

If you have Norton AntiVirus for Macintosh installed, LiveUpdate also updates virus definitions files and Norton AntiVirus program files, as well as its own program files.

If you use America Online (AOL) as your Internet Service Provider (ISP), you must log on to AOL before you use LiveUpdate. For more information, see "Using LiveUpdate with America Online" on page 182.

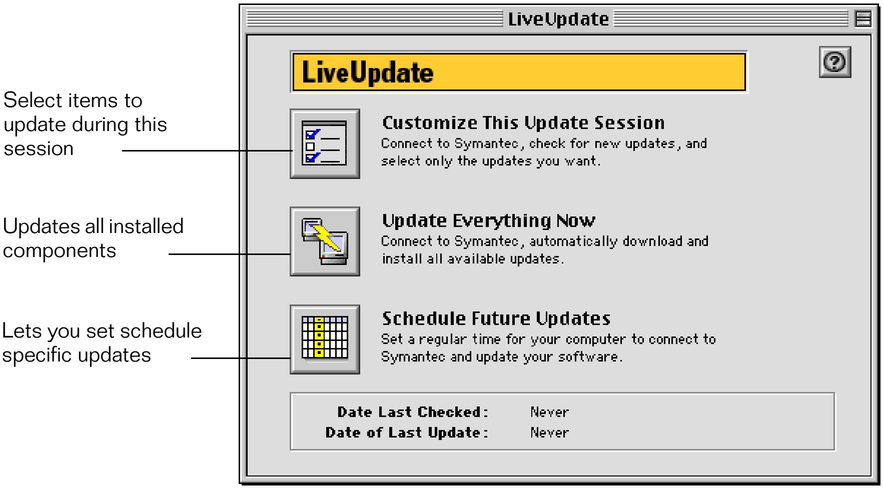
Updating program files

Use LiveUpdate to automatically download and install the latest program files with your subscription.

You can start Norton Utilities and use LiveUpdate at any time. You can also set LiveUpdate to run at a scheduled time. For details on scheduling, see "Scheduling LiveUpdate" on page 180.

To update program files with LiveUpdate:

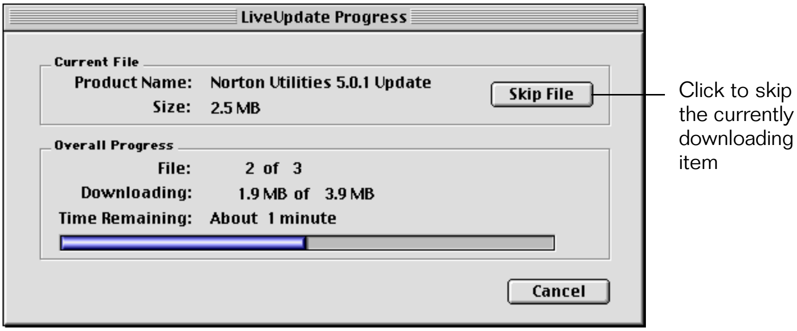
1. Start Norton Utilities.
2. Click LiveUpdate.


LiveUpdate
LiveUpdate
Customize This Update Session
Connect to Symantec, check for new updates, and select only the updates you want.
Update Everything Now
Connect to Symantec, automatically download and install all available updates.
Schedule Future Updates
Set a regular time for your computer to connect to Symantec and update your software.
Select items to update during this session
Updates all installed components
Lets you set schedule specific updates

Date Last Checked: Never
Date of Last Update: Never

3. In the LiveUpdate window, do one of the following:
   - To update all program files (as well as virus definitions if you have Norton AntiVirus installed), click Update Everything Now.
   - To specify what to update during the current session, click Customize This Update Session. For more information on this option, see "Customizing a LiveUpdate session" on page 179.
   - To open the LiveUpdate Scheduler and schedule LiveUpdate events, click Schedule Future Updates. For information on scheduling, see "Scheduling LiveUpdate" on page 180.

LiveUpdate automatically downloads and installs the available updates. A status dialog box keeps you informed of the file transfer process.

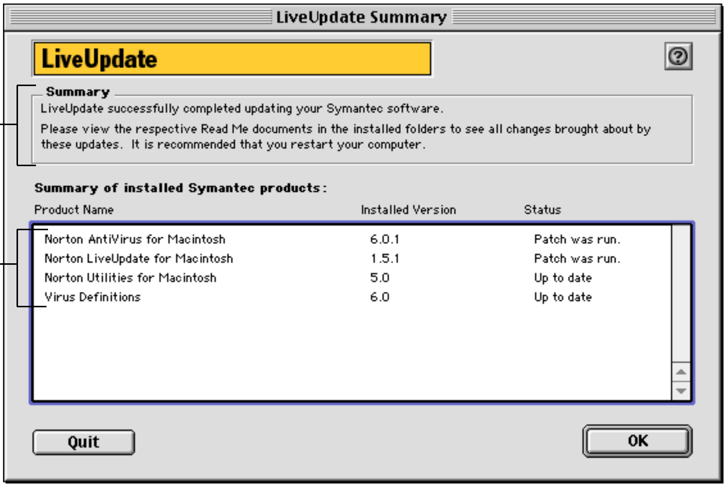


Product Name: Norton Utilities 5.0.1 Update
Size: 2.5 MB

File: 2 of 3
Downloading: 1.9 MB of 3.9 MB
Time Remaining: About 1 minute

The file transfer takes a few minutes. When file transfer is complete, LiveUpdate notifies you.

If your files are up-to-date, LiveUpdate informs you.



LiveUpdate gives a summary of its activity

List of products updated in this session

Summary

LiveUpdate successfully completed updating your Symantec software.

Please view the respective Read Me documents in the installed folders to see all changes brought about by these updates. It is recommended that you restart your computer.

Summary of installed Symantec products:

Product Name	Installed Version	Status
Norton AntiVirus for Macintosh	6.0.1	Patch was run.
Norton LiveUpdate for Macintosh	1.5.1	Patch was run.
Norton Utilities for Macintosh	5.0	Up to date
Virus Definitions	6.0	Up to date

4 If LiveUpdate tells you that you need to restart your computer, click Restart.

Checking the date of your program files

LiveUpdate lets you know if your files are up-to-date. You can also view the latest version number in the Norton Utilities About box, accessible from the Apple menu.

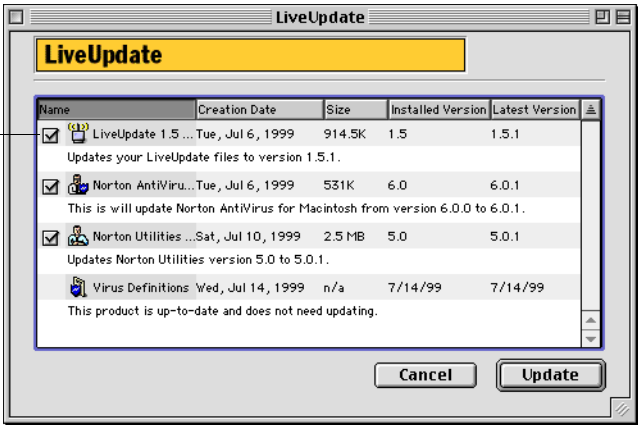
Customizing a LiveUpdate session

If you want to update only one or two items, you can select them and omit items you don't want to update.

To customize a LiveUpdate session:

1 In the LiveUpdate window, click Customize This LiveUpdate Session.

LiveUpdate presents a list of available updates.



Select items to update during the current session

Name	Creation Date	Size	Installed Version	Latest Version
☑ LiveUpdate 1.5 ...	Tue, Jul 6, 1999	914.5K	1.5	1.5.1
Updates your LiveUpdate files to version 1.5.1.				
☑ Norton AntiViru...	Tue, Jul 6, 1999	531K	6.0	6.0.1
This is will update Norton AntiVirus for Macintosh from version 6.0.0 to 6.0.1.				
☑ Norton Utilities ...	Sat, Jul 10, 1999	2.5 MB	5.0	5.0.1
Updates Norton Utilities version 5.0 to 5.0.1.				
Virus Definitions	Wed, Jul 14, 1999	n/a	7/14/99	7/14/99
This product is up-to-date and does not need updating.				

2 Select the items you want to update in this session. Deselect the items you do not want LiveUpdate to check for.

3 Click Update.

LiveUpdate downloads and installs updates for the items you selected.

Scheduling LiveUpdate

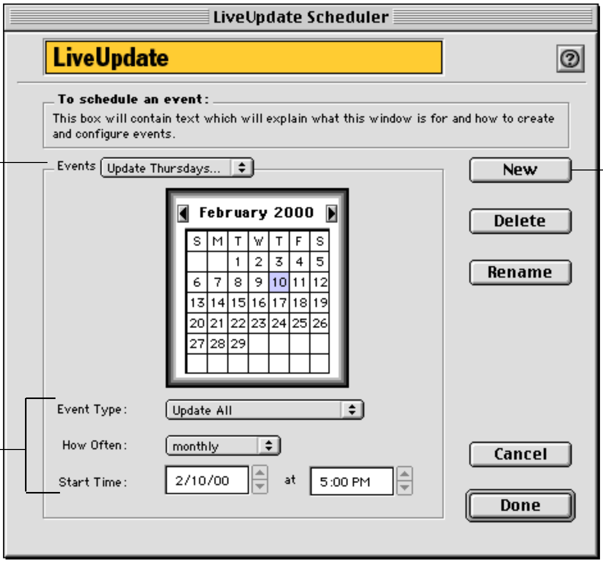
You can schedule automatic LiveUpdate sessions to update program files. Using the LiveUpdate Scheduler, you can set up events to run automatically.

Tip: Before scheduling automatic program files updates, make sure the update process works correctly by stepping through the process manually. See “Updating program files” on page 177 for instructions.

To schedule a LiveUpdate event:

1 In the LiveUpdate main window, click Schedule Future Updates.

The LiveUpdate Scheduler dialog box appears.



To schedule an event:

This box will contain text which will explain what this window is for and how to create and configure events.

Events: Update Thursdays...

February 2000

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29				

Event Type: Update All

How Often: monthly

Start Time: 2/10/00 at 5:00 PM

Select an event name

Add a new event

Select an event type, time, and frequency

2 Click New.

You are prompted to type a name for the event.

3 Type the event name in the text box, and then click OK.

The event name appears on the Scheduler dialog box.

4 Choose the Event Type, time, and frequency of updates.

The days on which updates occur are highlighted in the calendar. Dates for other scheduled events are underlined.

5 Finish scheduling the update by typing the schedule time and date.

- Click the Hour text box and use the arrow keys to set the start hour.
- Click the Minute text box to set the start minute.

6 Click Done.

Using LiveUpdate with America Online

If you use America Online (AOL) as your Internet Service Provider (ISP), you might need to log on to AOL before you use LiveUpdate.

To use LiveUpdate with AOL:

1. Log on to AOL.
2. On the AOL Welcome page, click the AOL Internet browser.
3. Minimize the AOL browser and any other open AOL windows.
4. Start LiveUpdate.
5. Follow the procedure from “Updating program files” on page 177.
6. When the LiveUpdate session is complete, close your AOL browser.

   If your LiveUpdate session requires that you restart your computer, disconnect from AOL before restarting.

APPENDIX A

Technical Reference

This Appendix describes the most common messages encountered when running Norton Disk Doctor.

Norton Disk Doctor error messages

Norton Disk Doctor identifies a wide variety of error messages. In most cases, they are self-explanatory, and Norton Disk Doctor provides recommendations. This section provides a list of the most common messages and a brief, general explanation.

Driver Descriptor Map and Partition Map errors

These structures contain information about the drivers that control a hard drive, as well as listing the locations and sizes of the volumes on a drive.

These problems can prevent volumes from being available:

Driver Descriptor Map errors

- The signature [block size / block count / driver count / driver start / driver size /driver type] is invalid.

Partition Map errors

- No partitions found.
- The physical start block [signature / block count / logical data start / data count / partition type] is invalid [or incorrect].

Master Directory Block and Volume Header Block errors

The Master Directory Block (MDB), located at sector 2 on an HFS-formatted volume or the Volume Header Block (VHB) on an HFS Plus disk, contains essential bookkeeping information about a volume. This includes the number of files and folders on the disk, the amount of free disk space, the allocation block size, and the sizes and locations of such structures as the Volume Bitmap, or Allocation File, the Catalog B-Tree, and the Extents B-Tree.

While the MDB or VHB is a vital structure, it is modified frequently, and damage in this area is not uncommon. In most cases, Norton Disk Doctor can easily repair problems in these areas.

The most common MDB or VHB error are identified by this message:

- The Free block count is incorrect.

  This is commonly associated with errors in the Volume Bitmap or Allocation file, since these structures keep track of free blocks on a volume.

- The contents of the allocation file/bitmap does not agree with the locations of all files as shown in the Catalog.

  These problems should be repaired whenever they occur, as they can lead to file damage through cross-linked files.

The following errors in the MDB or VHB usually indicate that the structure is damaged:

- The signature is incorrect.
- The attributes are incorrect.
- The creation date [or modification date] is invalid.

The following errors in the MDB or VHB indicate that the structure of the volume is incorrect and files may be inaccessible:

- The total file count [total directory count] is incorrect.
- The allocation block size [count of allocation blocks] is incorrect.

The following errors may indicate that the directories have been damaged:

- The next available file ID is incorrect.
- The Extents [or Catalog] B-tree clump size is invalid.
- The physical size of the Extents [or Catalog] B-tree is incorrect.
- Invalid extents are specified for the Extents [or Catalog] B-tree.

B-tree node errors

A B-tree node is a sector in the Catalog or Extents B-tree. These sectors contain important data about files on a volume.

The following messages indicate general problems with nodes in any B-tree. These types of error messages indicate that there is damage to a disk directory. If you see one of these messages, you may have found some files and/or folders to have been inaccessible.

- The node has an incorrect [forward link / backward link / type / depth / record count].
- The node is on an incorrect level.
- The node has incorrect offsets.

B-tree header errors

The B-tree header nodes contain important information about the structure of the Catalog and Extents B-trees, which contain information about the files on a volume.

The following error messages are caused by problems with any B-tree header. These types of messages indicate damage to your disk directories, and they may cause problems if you're trying to mount a disk.

- The tree depth [node size / key length / tree attribute flags] is / are incorrect.
- The number of nodes [free node count / tree bitmap / root node number / first leaf node number / last leaf node number / leaf record count / tree header structure] is incorrect.

Catalog tree errors

The Catalog tree contains essential bookkeeping information, including the physical locations, names, and sizes of files and folders. It also contains data such as file types and creators, and the number of files contained by a folder.

General tree error

When this error occurs, you may have seen a message that the disk cannot be mounted because it cannot be found. It indicates that an important part of the Catalog B-tree is damaged or missing:

- There is no root directory.

Record errors

Catalog tree record errors indicate damage to your directories. These types of errors can cause files to disappear or be inaccessible.

- The record has an incorrect key length [incorrect key / incorrect length].
- The record is out of order.
- The record key is duplicated.
- The leaf record has an incorrect type.
- The index record has an incorrect downlink.

Catalog tree leaf node errors

A *leaf node* is a node in the Catalog B-tree or Extents B-tree that contains file records or extents records. File records contain information about files stored on a disk, including their sizes, types and creators, attributes, and the actual physical locations of their data. Extents records contain the physical locations of those portions of fragmented files not tracked in the Catalog tree.

These errors can cause files to disappear or folders to appear empty:

- The leaf record has an invalid name.
- <filename> has a duplicated ID.
- No thread record found for <filename>.
- No parent directory found for <filename>.
- The leaf record has an incorrect Parent ID.

Catalog tree file record errors

Catalog tree record errors cause files to be damaged.

- <filename> has an incorrect clump size [extent starting block number / extent length / data (or resource) starting block number / logical length / physical length].
- <filename> has an empty extent descriptor.

Directory and file thread record errors

Directory thread record errors indicate that there is damage to a disk directory. If you see these messages, it may mean that some folders may be empty or can't be opened. File thread record errors are not as serious as directory thread records, but should be fixed.

- Thread record <filename> has an invalid target Parent ID.
- The thread record has an invalid target name.
- Thread record <filename> has an invalid reserved byte.
- No directory [or file] found for thread record <filename>.
- The thread record does not point to its associated file [associated directory].
- Thread record <filename> points to a file [or directory].
- The file thread flag for <filename> is off but should be on [on but should be off].
- The thread record is unnecessarily large, and is wasting space.

  (This last message does not indicate damage, but fixing it is recommended.)

Extents tree errors

The Extents B-tree keeps track of those extents (fragments) of fragmented files that are not stored in the Catalog B-tree. The following messages usually indicate that some files are damaged or lost:

- The extent record does not match a known file.
- The extent record has an invalid fork ID.
- The extent record has an empty descriptor.
- The extent record has an incorrect key [starting block number / block count].

File errors

These errors affect only the files that are listed and will not otherwise affect the validity of the structures of your disk. However, if System files are damaged it may affect the operation of your computer.

- The files are crosslinked and may be damaged.

  A crosslinked file is one that shares at least part of its space on disk with another file, damaging one or both files. You should examine all files after fixing them. If the files cannot be fixed, or prove to be damaged, delete them from your drive.

- The filenames begin with a period (.).

  Apple generally recommends against doing this, but some applications expect their hidden data files to be named this way. If you think you have such applications, you should not fix this error. You may wish to disable the check for this problem in Norton Disk Doctor's Preferences.

- The filenames contain a NUL (ASCII zero) character.

Note: Under OS X, file naming is more flexible, and filenames can begin with periods. This setting should always be turned off for any disks that are to be used with OS X.

- The bundle bit is off, but should be on [on, but should be off].
- The custom icon bit is off, but should be on [on, but should be off].

  These two types of errors may cause the file's icon to be incorrectly displayed in the Finder.

- The filenames contain a colon, which is an illegal character.
- The files have damaged resource forks.

  If these files are causing malfunctions or are suspected of causing problems, they should be deleted, because damaged System files or applications may cause your computer to crash. However, some files may contain irregularities that, although not affecting their functionality, could cause Norton Disk Doctor to flag them as damaged.

- The files have bad creation dates [modification dates / backup dates].

  Fixing these problems will set incorrect date to match other correct dates in the file record, or the current date.

- The Finder information is incorrect.

  This indicates a corruption of the flags controlling how the Finder displays the file.

HFS Plus Wrapper errors

The wrapper of an HFS Plus-formatted volume is a small HFS partition that is visible if you attempt to mount an HFS Plus volume under Mac OS 8.0 or earlier. It contains a text file explaining the nature of an HFS Plus volume, plus an invisible, minimal System file that is necessary to properly boot an

HFS Plus volume under OS 8.1. Damage to the wrapper can cause an HFS Plus volume to be inaccessible, or to fail to start up the computer.

These messages indicate errors that cause HFS Plus volumes to be unavailable:

- The embedded volume extent descriptor is missing [or incorrect].

These problems may cause an HFS Plus volume to have difficulty mounting:

- The root file count is incorrect.
- The root folder count is incorrect.
- The offset to the Volume Bitmap is incorrect.
- The offset to the first allocation block is incorrect.
- The default clump size is invalid.

The volume name is incorrect.

APPENDIX B

Norton Disk Companion

This appendix provides technical information on the structure and workings of Macintosh disks. This appendix describes:

- Physical format characteristics of your disk. See “The hardware” on page 192.
- Logical disk structures. See “The software” on page 197.
- Disk file system. See “How it all works” on page 204.
- Things that can go wrong with your disk. See “Avoiding disk errors” on page 209.

To become familiar with the inner-workings of your Macintosh disk, read this appendix from beginning to end.

Introduction

In many ways, disks are the most important part of your Macintosh. All of your data—your letters, memos, spreadsheets, databases, drawings, and the application programs that create them—are stored there. When you make changes to a document, changes are recorded (written) back to the disk. When you want to work with the document again, the next day or the next month, it’s there on disk, just as you left it.

Disks are something you rely on from day to day. To understand what can go wrong with a disk—whether it’s a floppy disk or a 6 GB hard disk—and to learn how such damage can be repaired, you need to know a little about how disks work.

About the Disk Companion

This part of the Reference Guide presents a brief tour of Macintosh disks. It describes the basic “building blocks,” such as platters, heads, tracks, and cylinders, and explains how they’re put together to make a disk drive.

It also examines the way information is stored on a disk using disk operating software—your Macintosh OS, and describes fundamental bookkeeping areas such as the boot blocks, the volume bitmap, and the catalog and extents trees.

Throughout, there are descriptions of what kinds of things can go wrong with disks, from problems that affect entire disk volumes to problems limited to single files.

The hardware

For disks—both floppy and hard—a recording head magnetizes microscopic particles embedded in a surface. Moving the particles past the magnetized head causes the particles to become magnetized.

Tracks and cylinders

On a disk, the data is written circularly, to be read by the head as the disk spins beneath it. Each circle of data is called a track. By applying a digital signal to the read/write (recording) head, information can be recorded on the disk track. A maximum signal represents the binary digit 1; no signal represents 0.

Data can be written first to the track on the top side of the disk, then, without movement of the head, more data can be written to the track on the bottom side. The pair of tracks that lie over each other and can be written without movement of the head assembly are collectively referred to as a *cylinder*.

Both cylinders and tracks are numbered. The outermost track is called track 0; the track on the top side of the disk is called track 0, side 0, and the track on the bottom is called track 0, side 1. Or you can refer to both tracks together as cylinder 0.

Hard disks

Typically, hard disks have several platters, mounted on the same spindle. Each platter has 2 heads—one for each side of each platter—mounted to a single arm and moving in tandem.

The key element of a hard disk is a magnetic head gliding a few microinches above a very rigid surface. It's imperative that the head be kept as close to the disk as possible, yet far enough away so that there is no danger of touching it, either as components heat up and expand or because of imperfections in the disk surface.

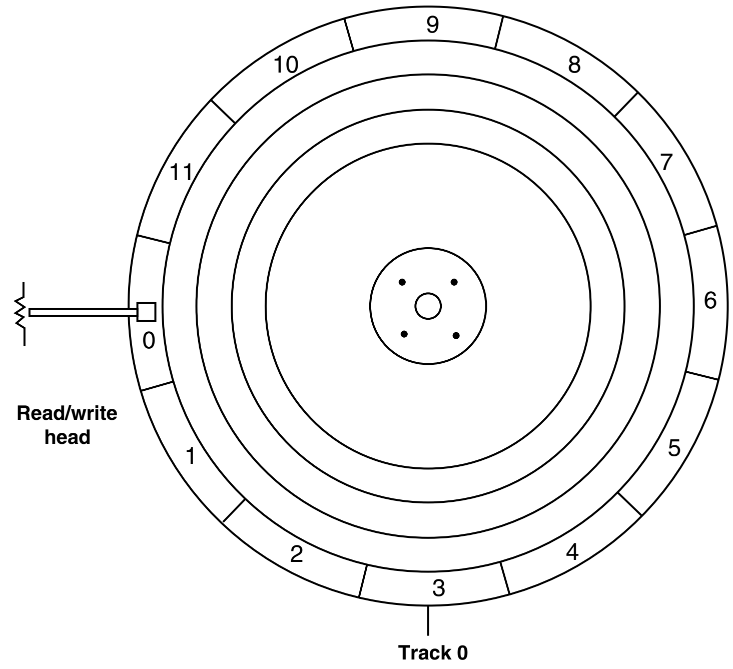
It is also necessary to keep particles from lodging between the head and the disk surface, which could result in loss of data. That, in turn, requires sealing the entire head-disk assembly (HDA) and microfiltering the air within the chamber, which means that that part of a hard disk always has to be assembled in a clean room.

Sectors

Disk controllers, both floppy and hard, are designed to read and write only a segment of a track at a time. The particular number of bytes in each segment, more commonly known as a *sector*, depends on the disk controller hardware and the operating system. Disk manufacturers design disk controllers to support several different sector sizes, and the operating system developers choose from among the available sizes. Most Macintosh disks have 512-byte sectors.

As an example, an 800K floppy averages 10 sectors per track, ranging from 8 (inside tracks) to 12 (outside tracks). Since each sector is 1/2K (512 bytes) and there are 160 tracks (80 on each side), that works out to 800K.

Sectors on an 800K floppy disk



Read/write head positioned over track 0, sector 0

With their higher rotational speeds, rigid surfaces, and stringent manufacturing tolerances, hard disks can hold both more tracks per side and more sectors per track. The most dramatic improvement comes from cramming in far more tracks per side than is possible on a floppy disk. A typical hard disk may have well over 600 tracks per inch.

Hard disks can also support more sectors in a given track, though here, the improvement is not nearly as dramatic.

Disk performance terms

Read the following terms to become more familiar with disk performance issues:

Seek time: The length of time the disk head takes to move from whatever track it's on, to whatever track you want to read. Since that varies each time you read—depending upon where the head was and how far it has to go to get to the desired track—there are different varieties of seek time, the most important of which is *track-to-track seek time.*

> **Track-to-track seek time:** The length of time required to move from one track to an adjacent track. Track-to-track seek times are generally between 8–10 milliseconds. Seek times for floppy disks are many times greater than those for hard disks.

Access time: The time required for the head to *seek*, or move to, the track that holds the data you want. If you left the disk head on track 3 after your last read and you now want to read data from track 4, the access time would be equal to the track-to-track seek time.

> **Average access time:** The average time it takes to move the head from the current position to the track you want to read. The average access time is somewhere between the time required to seek across one-fourth and one-half the total number of tracks. The average time to access any arbitrary track is equal to the time required to seek across one-third of the tracks.

Latency: Two requirements must be satisfied before the disk head can begin reading data. First, it must move to (seek) the required track. Second, the particular sector of the track that is going to be read (or the sector that will be read first, for multiple-sector reads) must spin around under the head. Once the head is positioned at the right track, the time the head spends idle until the right sector comes around is called latency.

> **Average latency:** The time required for the disk to make half a revolution. Most hard disks spin between 5400 and 10000 rpm, or one revolution every 11.11 to every 6 milliseconds, so average latency varies between 5.6 and 3 milliseconds. This figure doesn't vary from drive to drive, so latency time won't help you compare one hard disk with another.
>
> Floppy disks, spinning at 300 rpm, have an average latency of more than 100 milliseconds, at least 20 times greater than the average latency for hard disks.

Transfer rate: The speed at which bits are read from the disk; that is, the speed at which they can be transferred from the disk to your Macintosh.

Transfer rate depends both on how fast the disk is spinning—you can't read a bit until you get to it—and on how densely bits are packed around the track. Hard disks dramatically outperform floppy disks, both because of the hard disks' higher rotational speed and because of their higher bit-packing density.

Macintosh hard disks using the Small Computer Systems Interface (SCSI) have a maximum transfer rate of 232 Kbits/second. SCSI accelerators are available that boost this figure into the megabit (Mbit) range. The IDE (Integrated Drive Electronics) drives used on newer Macintosh computers have a slightly slower but comparable transfer rate. Floppy disks, which rely on serial communications, are much slower, on the order of 80 Kbits/second.

Sector addressing

Sectors are numbered sequentially around the track, so a sector's address is its sequence number around the track.

Before a sector can be read, there must be an identifying marker. Before the disk is first used, the sector address of each sector is written into the sector itself, during the formatting of the disk. The address goes into a preamble to the sector data itself. Along with the sector address in the preamble, some special synchronization bytes are written; these are a unique sequence of bytes that appear at the head of each preamble, letting the disk controller know that it's about to read a sector address. Finally, there are gap bytes—filler bytes placed between sectors to create a timing tolerance for the reading of each sector.

Cyclical redundancy check (CRC)

When a sector is written, a special *checksum* value, called the cyclical redundancy check (CRC), is calculated, based on the value of all the bytes written to that sector. This value is written to a special location on the disk, immediately following the sector data. When the sector is later read from the disk, its CRC bytes are also read. The same calculation that determined the CRC bytes that were written on the disk following the sector data is performed again, this time on the data that was just read. The CRC calculated from the data just read is compared to the CRC that was calculated and written to the disk. If the two values don't match, it means the data read is not exactly the same as the data that was written; that is, a read error has occurred.

Interleave

Interleave refers to the renumbering of sectors on a track so that the controller can more efficiently feed data read to the CPU. For example, an interleave of 2 means that the controller reads every other sector as the disk spins, an interleave of 3 is every third sector, and so on. Interleave is set when a disk is formatted; optimal values are dependent on such factors as drive bus and CPU speeds.

Physical formatting

Writing the sector addresses, sync bytes, gap bytes, and a few other miscellaneous chunks of data into the sector preamble is called *hard, physical,* or *low-level formatting*. During low-level formatting, software in your Macintosh tells the disk device driver to format a track and specifies a few parameters; from then on, it's the job of the controller to execute the format.

The physical formatting must be done before any disk can be used for data storage. A second, separate process, called *logical formatting* (discussed below), must also take place before a disk is ready to store data.

The Erase Disk command in the Special menu of the Finder carries out both aspects of the job for floppy disks, but only the logical formatting for hard disks. When you format a floppy disk, the Erase Disk command first performs a physical (hard) format on the disk, followed by a logical format. When you format a hard disk, it skips the physical formatting and only performs the logical format. To perform the physical format, you need to use formatting software.

The software

For speed and efficiency in accessing particular bytes out of 1000 or more megabytes, it is necessary for the operating system to construct some directories and indexes telling it what's where, which parts of the disk are spoken for, which parts are free, and even which parts should never be used because of physical damage. The way such information is organized on the disk is called the *logical format* of the disk, and the process of writing the various directories and indexes that support this organization is called *logical formatting*, or *initializing*. As mentioned earlier, when you format a hard disk using the Finder's Erase Disk command, all you are really doing is a logical format; the physical format has already been done. With a floppy disk, on the other hand, the Erase Disk command first performs a physical format, then automatically follows with a logical format.

The Macintosh operating system uses one of two formats: HFS (Hierarchical Filing System), and the Mac OS Extended format, also called HFS Plus. Both of these organize the logical disk into 6 main areas, although they use slightly different terminology. These are the Boot Blocks, Master Directory Block or Volume Header Block, volume bitmap or allocation file, the catalog tree, the extents tree, and the data area. Each hard drive also has an area reserved for partition information, which stores the disk's driver and a map of the volumes on the drive.

Volumes

The computer's operating system deals with a disk's logical structure by accessing a *volume*. Each disk icon appearing on your desktop represents a volume.

There can be more than one volume on a disk. A disk that has been *partitioned* into multiple volumes contains special bookkeeping information up front to let your Macintosh know how many volumes are on the disk, where each one is, how big it is, and so on. This type of information constitutes the first level of logical formatting. All floppy disks do not have an area for partition information and, therefore, can have only one user-accessible volume.

Whether it's a single floppy disk or a partition on a hard disk, a Macintosh volume contains all of the bookkeeping information mentioned earlier: boot blocks, Master Directory Block or Volume Header block, volume bitmap or allocation file, catalog and extents trees, and the data area. The format of this information has been precisely specified, and your Macintosh expects to find information of a specific type at predetermined locations on the disk. If any of the information is missing, damaged, or presented in an unexpected way, your Macintosh can't respond. (Fortunately, this kind of damage, though common, is easy to repair. Norton Disk Doctor can handle it automatically, with very little input from you.)

Boot blocks

The *boot blocks* always occupy the first two sectors of a disk volume. The boot blocks help your Macintosh start up, by providing information that the internal, read-only memory (ROM) uses to start your Macintosh.

Among other information, the boot blocks identify the filing system used on the disk (how and where to locate documents and applications), the names of important system files, the maximum number of files that can be open at once, and so on. Also included are portions of a small program that first loads itself into your Macintosh's RAM, and then loads critical parts of the operating system. This code starts after the identifying information and the rest of it is stored in ROM.

Master Directory Block or Volume Header Block

The *Master Directory Block* (MDB) or, on an HFS Plus volume, the Volume Header Block (VHB) contains critical information about the disk volume. It indicates the locations of other critical bookkeeping information such as the catalog and extents trees. This area contains other information including the name and size of the volume, how much space on it is unoccupied, where the System Folder is, and so on.

Volume bitmap or allocation file

The next several sectors contain the *volume bitmap*, called the *allocation file* in HFS Plus. This shows which parts of the volume are occupied and which are free. During physical formatting, a disk is divided into sectors of a specific length, depending on the disk. The logical equivalent of sector is *block*. A block is the minimum amount of disk storage that your Macintosh handles. Each block is equivalent to at least one sector, sometimes two or more.

A file, whether it's a document, an application, or a system file, occupies an integral (whole, not fractional) number of blocks on your disk. Thus, an 1100-byte file will take up three 512-byte blocks on your disk, even though most of the last block is empty.

That unusable space at the end of a block is called *slack* (space), and it's the reason files sometimes seem to shrink when you move them from a hard disk to a floppy and expand when you move them in the other direction. Different media can have different block sizes. For example, on HFS volumes, the following rules apply:

Hard Disk Capacity	**Allocation Block Size**
less than 32 MB	1 sector/block=512 bytes
32 to 64 MB	2 sectors/block=1K
64 to 96 MB	3 sectors/block=1.5K

On larger drives, HFS volumes waste a lot of space; a 4 GB volume has an allocation block size of 64K. This means no matter how small the file, it will always occupy of minimum of 64K of disk space—even if it contains less than 1K of data. HFS plus drives allow smaller allocation blocks—usually no larger than 4K—and waste much less space.

On a modern computer, all information is long strings of 1s and 0s. Each position in such a string is called a *bit*, and represents the smallest possible unit of data. In the volume bitmap, each bit corresponds to one block in the data area of the volume, where files are actually stored. The first bit in the bitmap corresponds to the first block in the data area, the second bit to the second block, and so on. When a bit is set to “1,” the corresponding block is currently occupied by data belonging to a file. When the bit is set to “0,” it is free to be assigned to another file. Thus, the volume bitmap keeps track of which blocks are occupied and which are free. Your Macintosh uses this information to determine where to put new files and additional parts of existing files. If the bitmap is incorrect, files may get written on top of other files by mistake, resulting in data loss.

Ways of counting

The Mac OS locates data on a disk by a one-dimensional sector numbering scheme; numbering all the sectors sequentially, starting with sector 1 of side 0, track 0, proceeding through all the sectors on track 0, then on to the sectors on side 1, track 0. All the sectors in a cylinder are numbered first before the System moves on to the next cylinder; that minimizes head movement, and, therefore, access time, when sectors are read sequentially. This continuous sector-numbering scheme is called *logical sector numbering*; unlike physical sector numbers, which start at 1, logical sector numbers start at 0.

On top of this numbering scheme, which numbers all the sectors on the physical drive, there is a second layer of numbering that numbers the sectors in a logical volume. If a 1 GB drive is partitioned into two 500 MB volumes, then the physical drive will be numbered 0 to 2 million, and each logical drive will be numbered 0 to about 1 million. (Remember, a sector is 1/2K, so there are 2048 sectors in one MB.)

On an HFS volume, skip over all the sectors occupied by the boot blocks and the Master Directory Block, including the volume bitmap. These areas, which are always set up during logical formatting, are all considered part of the system area and are excluded from the block-numbering scheme. All the sectors beyond the system area, starting with the first sector after the volume bitmap, are considered part of the data area and are included in the block-numbering scheme. On a 32 MB hard disk, with a block size of one sector, the first available block on the hard disk would start at sector 19; that's because the boot blocks, the Master Directory Block, and the volume bitmap all take up the first nineteen sectors. Thus, block 500 in the data area would be equivalent to sector 519 on the hard disk. If the block size were two sectors, then block 500 would be equivalent to sector 1019. In HFS Plus, blocks are numbered from the very beginning of a logical volume, which means that the boot blocks, the Volume Header Block, and the allocation file are all part of the block-numbering scheme. Thus, on an HFS Plus volume with a block size of two sectors, block 500 would equate to sector 1000.

Files in flux

The basic problem with managing computer files is that they're constantly changing. Suppose you have a file that's 2,250 bytes long, and you are writing it to a 1.4 MB floppy disk. The smallest number of bytes that can be read or written from a disk is a single sector. That's the block size on a 1.4 MB floppy. You need 5 sectors (blocks) to hold our 2,250-byte file. The first four sectors will hold 2,048 bytes, which means you need only 202 bytes of the last sector. Since your Macintosh can't write a partial sector, it will reserve all of the fifth sector for the file, letting the remainder of the last sector go to waste. The new file will occupy five adjacent sectors of the disk's file data area, after the bookkeeping information.

Now write a second file that's seven sectors long. It will occupy the next seven sectors of the data area. But wait: Suppose you want to add 460 bytes to your first file. As you'll recall, only 202 bytes of the last 512-byte sector was in use, so you still have room for 310 bytes there. But that leaves 150 bytes (460 minus the 310 bytes added at the end of the last sector); where do they go?

The first sector after your five-sector file is already in use by the seven-sector file. Moving that next file up a sector would take a while. And what if the next megabyte of sectors were already taken by files. You'd have to move a megabyte of data just to write 150 bytes, which is not a good solution.

The Macintosh OS solves this problem by letting files be stored in pieces if necessary—a process called *fragmentation*. Information about these file pieces, called *extents,* is kept in the file's catalog record, and, if necessary, in the *extents tree*. When your Macintosh needs to write more information to a file, it first checks the volume bitmap to find the next free block. It then reserves it for your file. In the previous example, the first five plus seven sectors are taken, so the first free sector is located about 13 sectors from the beginning of the file data area. Your file now occupies the first five sectors of the file data area, plus the 13th sector. So your file is fragmented now; the beginning portion is stored in contiguous sectors at the beginning of the disk, while the ending portion is elsewhere.

The bookkeeping entry for each file can handle up to three pieces in either fork of the file, or up to eight pieces in HFS Plus. For files whose resource or data forks are fragmented into more than three or eight pieces, however, additional help is needed to keep track of the file's data.

The extents tree

The extents tree stores this overflow information. For each additional extent (piece) in a file, the tree keeps track of the file the extent belongs to, where the extent begins, and where it ends.

Note: The extents and catalog trees are called b-trees because of the way they're structured. Data are stored in *nodes*. There are two types of nodes: *index* nodes and *leaf* nodes. Index nodes are used to locate information stored within the tree; leaf nodes are used to store the information itself. Nodes are stored in different levels, from the root onward. Within each level, nodes are linked to each other. The entire structure resembles an upside-down tree. The “b” stands for “balanced,” indicating that information is spread out evenly across each level of the tree.

Catalog tree

The HFS (Hierarchical Filing System) keeps track of a limitless number of files and folders. File locations are stored in the *catalog tree*.

The catalog tree is similar in form to the extents tree. The catalog tree keeps track of all folders, documents, and applications on your disk. Among other information, it stores the beginning location of each file and its length.

The catalog b-tree is the central repository of information about files on a disk. Each file, whether it be a folder, a document, or an application, has an entry within the catalog tree. This entry includes the file's name, the folder it is located in, its location on the desktop, and the location and length of the file's *data* and *resource forks*.

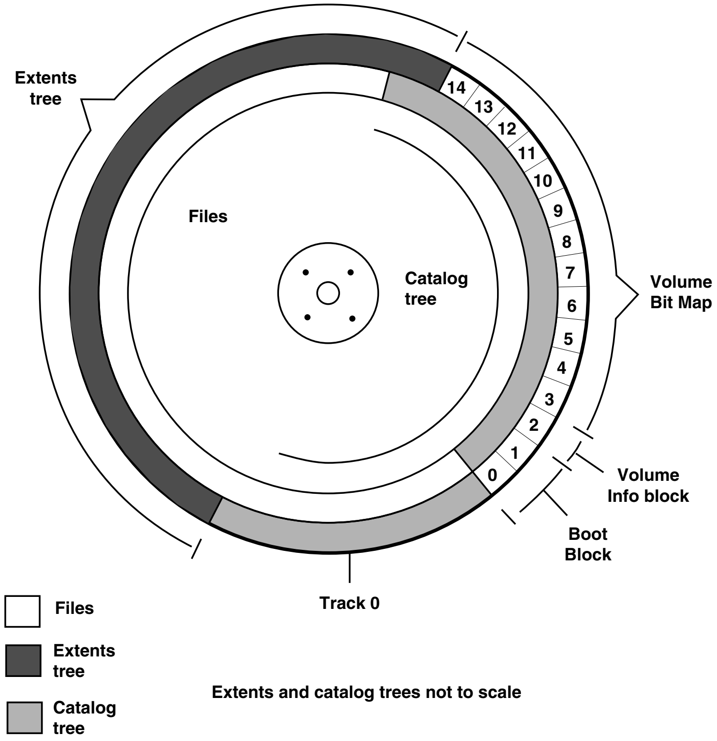
Which fork do I use?

Macintosh files can have two forks. The *data* fork generally stores more changeable data, such as the contents of a letter or a database. The *resource* fork generally stores less changeable data, such as program code, icons, the contents of dialog boxes, and other resources.

Not all files have both forks. Documents often have only a data fork, with a resource fork of zero length. Applications, on the other hand, generally have a resource fork and a zero-length data fork.

The filing system keeps track of both forks of a file, including where each starts, how long it is, and where its pieces are stored. The first three pieces of each fork or eight, in HFS Plus, are tracked in the catalog b-tree. Other pieces (extents) are tracked in the extents b-tree.

The well-tempered disk



Extents and catalog trees not to scale

1:1 Interleave (for clarity)

How it all works

The Hierarchical Filing System (HFS) is easiest to understand if you look at your Macintosh in action. That way, you can see how each element of the file system contributes to the process of creating and managing files.

Creating a file

Suppose you've begun to compose a memo to the boss. The first time you choose Save, a dialog box appears asking you to give the new document a name. You type in "Memo to Boss," and press Enter. Now your Macintosh's file system knows several things about the document that are of immediate interest: among them, its name and the ID number of the folder it's in. These two pieces of data are all the information your Macintosh needs to locate a document. (The ID number was assigned when the folder was first created. The Master Directory Block keeps track of the next available ID number.) Your Macintosh uses this information to determine where to store the catalog entry for the new document. Since most applications need to be able to save documents, and it's important that they all do it in the same way, the Macintosh operating system (OS) takes care of the details, using a set of OS routines called the File Manager (FM). An application, when it wants to save a document, passes off control of the system to the File Manager, informing it of the document's name, directory ID number, and so on. The application also tells the FM where to find the document's data in RAM.

Checking for room

To make certain there is enough room on the disk, the amount of free space on the chosen volume is compared with the amount of space that your application has requested for the new file. If there is enough room, the FM reserves enough blocks to accommodate the file, plus a little slack at the end to help keep down future fragmentation. A number stored in the Master Directory Block tells your Macintosh where to begin scanning the disk in order to find sufficient room. Once space has been found, those blocks are marked "in use" in the volume bitmap. The document can now be copied from RAM to disk.

Doing the books

Your Macintosh now needs to record where the document has been stored on your disk, so it can be found in the future. This information is stored mainly in the catalog b-tree.

The catalog b-tree is composed of nodes. These nodes are linked to each other. Nodes to the left of a particular node refer to lower ID numbers, nodes to the right refer to higher ID numbers.

There are two main types of nodes: index nodes and leaf nodes. Index nodes are used to find the file information stored in the leaf nodes. The index nodes point the way to the leaf nodes.

At the first level of the catalog tree is the root node. The root node of the catalog tree has entries, which give ranges of file numbers. Each entry points the File Manager to a node at the next level.

File Manager compares the number it's using for the file it wishes to save with each entry in that node. When it finds a range that the file number falls into, it transfers to the node pointed to by that entry. Each level of index nodes becomes increasingly specific.

Note: A smaller disk may have fewer levels of index nodes than are shown in this example.

To find a file under HFS or HFS Plus, the File Manager first looks at the root node of the catalog tree. The location of the root node is stored in the catalog tree header, which is itself referenced by the Master Directory Block or Volume Header Block. The root node may contain a quantity of index records, each of which points to a unique node at the next level down from the root node. The FM compares the directory ID for the file it has been given with each index record.

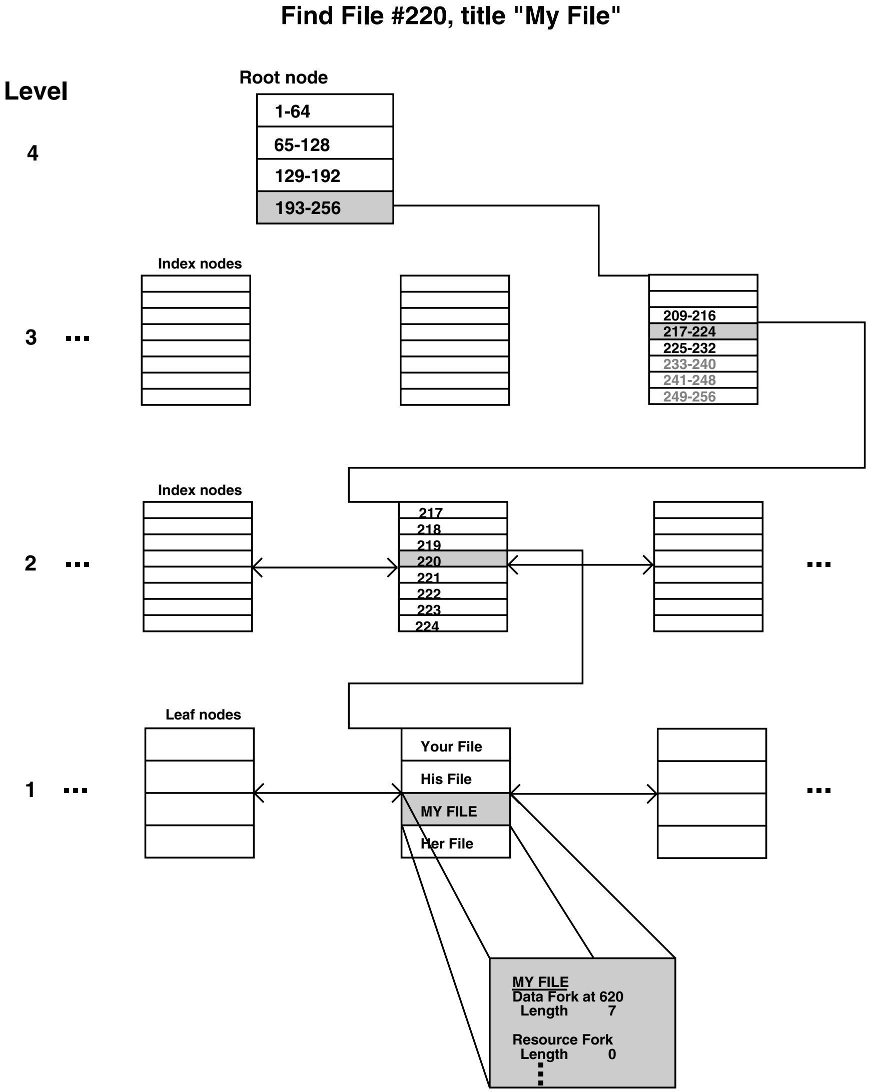
Each record contains a directory ID range and a link, and this link points to a unique index node on the next level. By comparing the directory ID number with successive records in each index node to which the directory is pointed, you can determine which record points to the correct node on the next level, until you find the leaf node that contains information about the document you want. The process of searching through the catalog b-tree to find a particular leaf node is called *parsing* the tree.

Back to file creation

When your Macintosh gets ready to store information about a new document, it first searches the catalog b-tree to find the leaf node associated with the folder in which the document is to be stored. It does this by comparing the folder's directory ID number with the numbers stored in each index record. It starts with the root node of the tree and is pointed to the appropriate index nodes at each successive level.

Once the correct leaf node has been located, HFS checks to make sure that the name you've chosen for your document hasn't been taken already. If not, all the appropriate information about the document—its size, where on the disk its resource and data forks are located, and so on—is stored in a leaf record in that leaf node.

Parsing the catalog b-tree



Opening and changing a file

Suppose you want to work on the document that you created in the previous example. You choose Open from the File menu, find the correct filename, select it, then press Enter. What happens inside your Macintosh?

File Manager is told the name and directory ID of the file you want to open. The File Manager then parses (searches through) the catalog b-tree, using the file's directory ID to find the correct leaf node and the file's name to find the correct leaf record in that node. When File Manager has determined where the file is located on disk, it sets up a bookkeeping area in RAM to keep track of the file; contents of this area include the file's location and other information. (This bookkeeping area is called a File Control Block, or FCB. A number within the Master Directory Block or Volume Control Block of the Startup disk specifies how many of these FCBs—and, therefore, how many open files—the current setup can support.)

The file is marked "busy," meaning another application can't open it until your word processor has finished with it. File Manager returns control to your word processor, informing it where in RAM it has stored the file's bookkeeping info (the FCB). It's now up to your word processor to read some or all of the file's data into RAM and to display it in a form you can work with.

Changing a file

You expand your memo to the boss into a full-blown report. Now you want to save your work. Where is the new information that you've added stored?

It depends on the condition of your disk. When you create a file, your Macintosh reserves a little bit more space than it needs. This is called the file dump. The file can grow into this space later if it needs to. However, if you add enough to a file, the reserved space will fill up. If you need more room, File Manager will have to look for it.

In all likelihood, the next available free space won't be at the end of the file, but someplace else on the disk. So FM must locate the next free area of sufficient size, write the information there, then record the location of the piece of the file it just created. The file is now fragmented.

Deleting a file

What happens when you delete a file? Curiously enough, the file's data isn't touched. Instead, File Manager parses the catalog tree to find where the file was stored, marks those blocks "available" in the volume bitmap (changing 1s to 0s), then erases the file's leaf record from the appropriate leaf node in the catalog tree.

So, if you change your mind about the file you just deleted, you don't have to retype everything. Your report data is still there (presuming, of course, that the space hasn't been given up to another document. If you've done nothing else since deleting the file, the data is still there). It's simply a question of finding the data and restoring it; something that Norton Utilities UnErase can help you with.

Avoiding disk errors

Now that you know how a disk should work, you can understand what kinds of things can go wrong—and more importantly—how to avoid or fix them.

Starting with the boot blocks, you don't have to look far to see sources of potential trouble. When your Macintosh checks the boot blocks, it expects to find information of a particular type in a very specific format. If something unexpected is found, even if it's only one character off, your Macintosh can refuse to start up with the affected disk.

With the volume bitmap, it's possible, for example, for a block in the VBM to be marked as "in use," yet not be part of any file currently recorded in the catalog b-tree. This may just be an error (an accidentally flipped bit), or it could signal a lost file. On the other hand, a block might be marked "available" in the VBM, yet in fact belong to an existing file. If this error isn't detected and corrected (because the file is never opened in the meantime), the File Manager may assign the block to another file, thinking it's available. Thus, two files end up thinking the same block belongs to them both, a mistake referred to as *cross-linked files*. In such a case, the data in the older file is partially overwritten, causing data damage.

Problems with the catalog b-tree can also render a disk inaccessible. For example, if the catalog tree header (the first block in the tree) is damaged, your Macintosh may not be able to find the root node in the catalog tree. If it can't find the root node of the catalog tree, your Macintosh can't locate files. Your Macintosh will refuse to mount, or display, such a disk. It may even tell you it's damaged, and ask if you want to initialize it, or it may complain that it can't be used because it "can't be found."

Errors such as these can happen under the following circumstances:

- The system or an application crashes while directories are being modified.
- A SCSI or other device or driver malfunctions and sends bad data to a disk.

- The local power company sends a “spike” your way (a temporary surge in power that can cause bad data to be written to your disk).
- You turn off your Macintosh while an application still has files open or, is actually writing to your disk.

You can avoid a great many of these errors if you follow these precautions:

- Always close your documents before you quit working.
- Be sure to save your work.
- Never connect or disconnect external devices while they, or your computer, are on.
- Most important, always choose the Shut Down command to turn off your Macintosh. This command updates vital bookkeeping information.

Norton Disk Doctor can spot, report, and fix these logical errors. Running it regularly will help you to avoid them.

GLOSSARY

alert

Dialog box that appears on your screen to notify you that a virus or virus-like activity has been detected. You must respond by clicking a button or pressing Return.

alias

Shortcut icon that points to an original object (file, folder, or disk). *See* your Macintosh system documentation for details.

AppleShare

Extension that lets you access shared files on other networked Macintosh computers or AppleShare file servers.

AppleTalk

Network communications environment developed by Apple Computer.

application

Computer program written for a specific purpose, such as word processing or creating a spreadsheet. Also called program or application program.

ASCII

American Standard Code for Information Interchange. Standard that assigns a unique binary number (a byte) to each text character and control character.

baud rate

The speed at which a modem can transmit data. Baud rate measures the number of signal changes that occur in one second. *See also* "bps."

boot (v.)

To start a computer.

bps

Bits per second. Measure of speed in serial transmission. Also used to describe hardware capabilities (i.e., a 56000 bps modem). *See also* "baud rate."

BBS

Bulletin board service. Online service that allows messaging, electronic mail, and file transfer between computer users via modem.

compressed file

File that has been compressed using a special data storage format to save space on your disk.

creator code

Four-character sequence associated with a file that specifies which application created the file.

data fork

Part of a Macintosh file that contains data. For example, text entered using a word processor is stored in the data fork of the document file. *See also* "resource fork" on page 214.

document file

File that is created by or associated with an application and contains no executable code. Examples include word processing documents, databases, and spreadsheets.

download

To transfer a file from one computer system to another, usually through a modem. Usually refers to the act of transferring a file from the Internet, a bulletin board service, or a service such as America Online.

encryption

Method of imposing data security on selected files, folders, or disks. Encryption disguises data. Often the encrypted item is protected with a password so that only those knowing the password can access (decrypt and use) the data.

Exceptions List

Group of normally virus-like conditions that you have told Norton AntiVirus not to look for in a particular file. Exceptions are saved when you click the Remember button in a virus-like activity alert.

executable file

File containing program code that can be launched. Generally includes any file that is an application, extension, or a system file.

extension

See "system extension" on page 215.

file server

Central disk storage device connected to a network that provides network users access to shared applications and data files.

file type

Four-character code, stored along with a creator code in each file, that identifies its type. Applications use this code to determine if a file is in a format that can be read by the application.

Hayes-compatible

Modem that responds to the same commands as a modem manufactured by Hayes Microcomputer Products, originators of the standard for microcomputer modems.

icon

Graphic symbol used to represent a file, folder, disk or other entity.

INIT

See “system extension” on page 215.

infected file

File that contains a virus.

known virus

Any virus that Norton AntiVirus can detect and identify by name.

LAN

Local Area Network. Group of computers connected for the purpose of sharing resources. The computers on a local area network are typically located within a small “local” area such as a single building or section of a building.

launch

To start or run an application.

locked disk

See “write-protected disk” on page 216.

locked file

File that can be viewed, but cannot be written to or deleted. Also referred to as read-only.

mount

To make a Macintosh disk available for use on the desktop. When a disk is mounted, its icon appears on the desktop and you can access its files.

network

Set of computers and associated hardware (printers and so forth) connected together in a work group for the purpose of sharing information and hardware among users.

Norton AntiVirus Auto-Protect

Automatic protection feature that loads into memory at startup to guard your computer against viruses.

operating system

Program that ties the capabilities of computer hardware and software to input/output devices such as disks, keyboards, and mice.

partition

Portion of a disk (prepared and set aside by a special disk utility) that functions as a separate disk. When partitions are mounted to the desktop, a separate icon appears for each partition.

program

See “application”.

read-only

Disk, folder, or file containing data that can be read, but cannot be written to or deleted. Also referred to as “locked” or “write-protected.”

removable media

Disks that can be removed, as opposed to hard disks that are stationary. Some examples of removable media are floppy disks, disk cartridges (SyQuest and Bernoulli, for example), compact discs, and zip drives.

repair

To remove a virus from a file and return the file to its original, uninfected state.

resource fork

Part of a file that contains information used by an application, such as menus, fonts, icons, and the executable code. Most viruses attach themselves to the resource fork of application files.

scan

Systematic search for viruses by Norton AntiVirus.

startup

Process by which your computer starts working. During this process, system extensions such as Norton AntiVirus Auto-Protect are loaded into memory.

startup disk

Disk (hard disk or floppy disk) with all the necessary program files—such as the Finder and System files contained in the System folder—to set a Macintosh into operation. Sometimes called a boot disk or system disk.

system extension

Program that loads into memory when a Macintosh is started. Also known as a startup document. (In System 6, a system extension was called an INIT file.)

System file

File stored in the System folder that the Macintosh uses to start up.

System folder

Folder on the startup disk that contains the files your Macintosh requires to run, such as the System file, Finder, system extensions, desk accessories, and control panels.

Trojan horse

Program that promises to be something useful or interesting (like a game), but may covertly damage or erase files on your computer while you are running it. Trojan horses are not actually viruses because they do not replicate or spread to other files.

unknown virus

Virus for which NAV does not contain a virus definition. *See also* “virus definitions file”.

virus

Self-replicating program written intentionally to alter the way your computer operates without your permission or knowledge. A virus attaches copies of itself to other files, and when activated, may damage files, cause erratic system behavior, or merely display annoying messages.

virus definitions file

File that comes with the NAV software package and provides information for finding and repairing viruses. Also called built-in definitions. You can download a new virus definitions file from Symantec BBS, CompuServe, Applelink, and America Online bulletin board services.

virus-like activity

Activity or action caused by other software that NAV perceives as the work of a possible unknown virus. Virus-like activity alerts do not necessarily indicate the presence of a virus, but should be investigated.

worm

Program that replicates without infecting other programs. Some worms spread by copying themselves from disk to disk, while others replicate only in memory to slow down a computer. So far, worms do not exist in the Macintosh world.

write-protected disk

Disk that cannot be written to or erased. Write-protecting disks prevents viruses from infecting them. To write-protect a 3.5-inch disk, slide the tab on the back of the disk to uncover the hole through the disk. Also referred to as a “locked disk” or “read-only disk.”

SUPPORT

Service and support solutions

Service and support information is available from the Help system of your Symantec product. Click the Service and Support topic in the Help index. Macintosh users can click the About... command on the Apple menu, and then click Info to view Technical Support and Customer Service contact information.

Technical support

Symantec offers several technical support options:

- StandardCare support

  Connect to the Symantec Service & Support Web site at http://service.symantec.com, then select your product and version. This gives you access to product knowledge bases, interactive troubleshooter, Frequently Asked Questions (FAQ), and more.

- PriorityCare, GoldCare, and PlatinumCare support

  Fee-based telephone support services are available to all registered customers. For complete information, please call our automated fax retrieval service at (800) 554-4403 and request document 933000.

  For telephone support information, connect to http://service.symantec.com, select your product and version, and click Contact Customer Support.

- Automated fax retrieval

  Use your fax machine to receive general product information, fact sheets, and product upgrade order forms by calling (800) 554-4403. For technical application notes, call (541) 984-2490.

Support for old and discontinued versions

When a new version of this software is released, registered users will receive upgrade information in the mail. Telephone support will be provided for the old version for six months after the release of the new version. Technical information may still be available through the Service & Support Web site (http://service.symantec.com).

When Symantec announces that a product will no longer be marketed or sold, telephone support will be discontinued 60 days later. Support will be available for discontinued products from the Service & Support Web site only.

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- Obtain product literature or trialware.
- Locate resellers and consultants in your area.
- Replace missing or defective CD-ROMS, disks, manuals, and so on.
- Update your product registration with address or name changes.
- Get order, return, or rebate status information.
- Access customer service FAQs.
- Post a question to a Customer Service representative.

For upgrade orders, visit the online upgrade center at: http://www.symantec.com/upgrades/ or call the Customer Service Order Desk at (800) 568-9501.

Worldwide service and support

Technical support and customer service solutions vary by country. For information on Symantec and International Partner locations outside of the United States, please contact one of the service and support offices listed below, or connect to http://www.symantec.com, select the country you want information about, and click Go!

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When you near the end of your virus protection subscription, you will be prompted to subscribe when you start LiveUpdate. Simply follow the instructions on the screen. After your free subscription ends, you must renew your subscription before you can update your virus protection. Renewal subscriptions are available for a nominal charge.

To order a subscription, do one of the following:

- Visit our Web site at: http://www.shop.symantec.com.
- Outside the United States, contact your local Symantec office or representative.

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October 2000

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